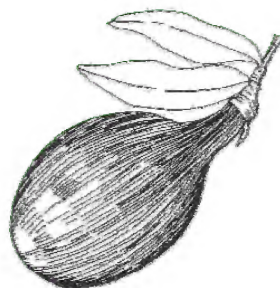
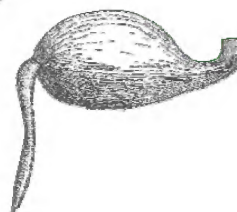
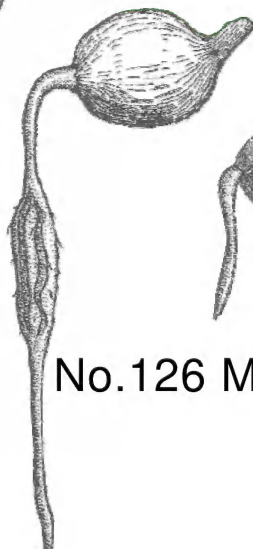
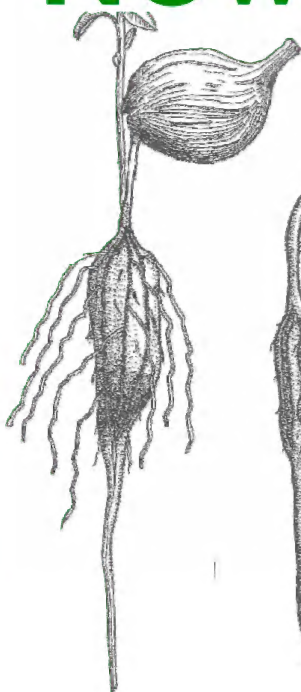


ASBS

*Australian
Systematic
Botany
Society*



Newsletter



No.126 March 2006

Price: \$5.00

ISSN 1034-1218

AUSTRALIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

Council

President

John Clarkson
Centre for Tropical Agriculture
PO Box 1054
MAREEBA, Queensland 4880
tel: (07) 4048 4745
email: John.Clarkson@nrm.qld.gov.au

Vice President

Darren Crayn
Royal Botanic Gardens Sydney
Mrs Macquaries Road
SYDNEY NSW 2000
tel: (02) 9231 8111
email: darren.crayn@rbgsyd.nsw.gov.au

Secretary

Kirsten Cowley
Centre for Plant Biodiversity Research
Australian National Herbarium
GPO Box 1600, CANBERRA ACT 2601
tel: (02) 6246 5024
email: Kirsten.Cowley@csiro.au

Treasurer

Anna Monro
Centre for Plant Biodiversity Research
Australian National Herbarium
GPO Box 1600
CANBERRA ACT 2601
tel: (02) 6246 5472
email: Anna.Monro@csiro.au

Councillor

Dale Dixon
Northern Territory Herbarium
Parks & Wildlife Commission of the NT
PO Box 496
PALMERSTON, NT 0831
tel.: (08) 8999 4512
email: Dale.Dixon@nt.gov.au

Councillor

Marco Duretto
Tasmanian Herbarium
Private Bag 4
HOBART, Tasmania 7001
tel.: (03) 6226 1806
email: marco.duretto@tmag.tas.gov.au

Other Constitutional Bodies

Public Officer

Kirsten Cowley
Centre for Plant Biodiversity Research
Australian National Herbarium
(Contact details above)

Hansjörg Eichler Research Committee

Barbara Briggs
Rod Henderson
Betsy Jackes
Tom May
Chris Quinn
Chair: Vice President (ex officio)

Affiliate Society

Papua New Guinea Botanical Society

ASBS Web site

www.anbg.gov.au/asbs

Webmaster: Murray Fagg

Centre for Plant Biodiversity Research
Australian National Herbarium
Email: Murray.Fagg@deh.gov.au

Loose-leaf inclusions with this issue

- ASBS Conference, Cairns
- CSIRO Publications brochure

Publication dates of previous issue

Austral.Syst.Bot.Soc.Nsltr 125 (December 2005 issue)

Hardcopy: 10th February 2006; ASBS Web site: 10th February 2006

ASBS Inc. business

From the President

Council has decided that the practice of having an image on the cover of the Newsletter which reflects the research interests of the current President should be reinstated. Trevor Clifford was the first of seven Presidents who have done this. His choice, *Triodia marginata* appeared for the first time in June 1982 on the cover of Newsletter 31. There is coincidentally a link between Trevor and my choice, which will become apparent later.

Contrary to popular myth, the “little green things” which replaced Gordon Guymer’s *Brachychiton spectabilis* on the cover of Newsletter 89 were not one of Tim Entwistle’s organisms. Tim quashed this idea in Newsletter 90 where he pointed out that he studied “larger red things”. Thus, plain, pale green covers have prevailed for the last three Presidents Tim, Barry Conn and Stephen Hopper.

My choice is *Jedda multicaulis*, an erect, evergreen shrub known only from a very restricted area on Cape York Peninsula. It is rather special to me for it was the first plant I named (Clarkson 1986). But there is more... The plant has a strange germination behaviour which had not been previously recorded for a woody dicot from the Australian flora. Trevor Clifford and I described this at length in a paper in the *Australian Journal of Botany* (Clarkson & Clifford 1987). This is the link I alluded to earlier. The restricted distribution is hard to explain for it is found in a forest type that is

common and widespread across Cape York Peninsula. I have spent more than 25 years expecting to find another population just around the next corner but never have.

Jedda has been the focus of two postgraduate research projects (Poon 2002; Roberts in prep.). One of these students, Tony Roberts from James Cook University, a member of ASBS, successfully applied for a Hansjörg Eichler research grant in 2005. Hopefully his report will appear in the *Newsletter* in the not too distant future.

The illustration used was adapted from drawings done by Will Smith from the Queensland Herbarium.

References

- Clarkson, J.R. (1986). *Jedda*, a new genus of Thymelaeaceae (Subtribe Linostomatinae) from Australia. *Austrobaileya* 2(3):203-210.
- Clarkson, J.R. & Clifford, H.T. (1987). Germination of *Jedda multicaulis* J.R. Clarkson (Thymelaeaceae). An example of cryptogeal germination in the Australian flora. *Australian Journal of Botany* 35:715-720.
- Poon, E.L. (2002). *Searching for new populations of rare plant species. Two case studies from Cape York Peninsula*. Honours Thesis, James Cook University, Cairns, Australia.
- Roberts, A.T. (in prep). *An investigation into the causes of rarity of an environmentally hardy, savanna plant: Jedda multicaulis*. MSc Thesis, James Cook University, Cairns, Australia.

28th Annual General Meeting of the Australian Systematic Botany Society, Inc.

5:00 pm, Monday 27th March, Australian National Herbarium, Canberra, ACT

Starting time: 5:05 pm. The President welcomed those present.

Present: John Clarkson (President), Darren Crayn (Vice President), Anna Monro (Treasurer), Brendan Lepschi (Secretary – outgoing (Minutes)), Kirsten Cowley (Secretary-elect, Public Officer), Marco Duretto (Councillor), Dale Dixon (Councillor-elect), and 11 Ordinary Members.

Apologies: Bill & Robyn Barker, Barbara Briggs, Lyn Craven, Barry Conn, Peter Wilson.

1. Minutes of the 2005 Annual General Meeting

Proposed that the minutes of the 27th Annual General Meeting (as published in the *Australian Systematic Botany Society Newsletter* 123 – see Attachment 1) be accepted.

Proposed: Marco Duretto; seconded: Karen Wilson. Carried.

2. Business arising from minutes

Nil.

3. Presidents report

Presented by John Clarkson. See Attachment 2.. **Proposed for acceptance: Brendan Lepschi; seconded: Rosemary Purdie. Carried.**

4. Treasurers report

Presented by Anna Monro. See Attachment 3.

Queries from floor regarding potential new products that ASBS could develop to raise additional funds. Isobel Crawford suggests a simplified book on botanical Latin. Karen Wilson suggests a revised *Flora of Central Australia*.

Query from Karen Wilson regarding whether unfinancial members will be able to vote in the impending rule-change ballot. Anna Monro confirms this is the case, as unfinancial members afforded a period of 'grace' until 30th June.¹

Acceptance proposed: Anna Monro; seconded: Annette Wilson. Carried.

5. Financial year ballot

John Clarkson provided a brief summary of a special resolution to alter the wording of the Society's Rules to change the definition of the financial year. Members were referred to details of the resolution published as an insert in the *Australian Systematic Botany Society Newsletter 124*. Copies of this were distributed at the meeting.

There being no modification to the wording of the proposal, ballot papers will be sent to all members eligible to vote not more than 4 weeks after the meeting. **Proposed that the special resolution as worded in Nsltr 124 insert now be put to the membership for ballot: Annette Wilson; seconded: Anna Monro. Carried.**

6. Newsletter & web page report

Not available at the time of this meeting. Since received, see Attachment 4.

7. Eichler Research Fund

Darren Crayn presented a summary of Eichler Research Fund activities. Vote of special thanks to the Eichler Research Fund Committee (Barbara Briggs, Rod Henderson, Betsy Jackes, Tom May and Chris Quinn) for their efforts. **Proposed for acceptance: John Clarkson; seconded: Brendan Lepschi. Carried.** Questions from the floor regarding the apparently low number of applicants for Eichler Grants (three received for the first round in 2006). Teguh Triono suggested advertising more widely, including outside Australia, may encourage a larger pool of applicants. Council and Eichler Research Fund Committee to consider this and other options.

8. Any other business

Life membership for Robyn Barker

¹ **Clarificatory note(post-AGM).** Only members paid up for 2005 are eligible to be included in the vote if unfinancial for 2006. The voting method allows for removing unfinancial members while preserving anonymity of the actual votes cast. *John Clarkson, President*

Australian Systematic Botany Society Inc.

Have you voted?

The ballot to change the meaning of the term financial year as interpreted by the Society's Rules closes at **5 pm on Monday 15th May 2006.**

It is essential that you cast your vote.

Council would appreciate if you could please take a moment to check that you have voted and returned your ballot paper to the Secretary in the postage paid envelope you should have received in the mail.

Note: Please add PO Box 1600 to the address on the envelope.

Please post your vote now!

John Clarkson announced that Life Membership is to be conferred to Robyn Barker, in recognition of her tireless efforts on behalf of the Society, including serving on Council and most recently as *Newsletter* editor with Bill Barker. Vote of special thanks from Council and members for Robyn's continuing valuable input to the Society.

9. Election results

Two positions vacant due to the stepping down of the Secretary, and a subsequent nomination (Councillor). Returning Officer (Brendan Lepschi) indicated that the number of nominations received were the same as the number of vacancies. The following members elected (unopposed) to the positions indicated and took office from the close of the AGM.

- President: John Clarkson
- Vice President: Darren Crayn
- Secretary: Kirsten Cowley
- Treasurer: Anna Monro
- Councillor: Marco Duretto
- Councillor: Dale Dixon

Kirsten Cowley will also continue as Public Officer.

The President (John Clarkson) proposed thanks to the Council for their efforts over the previous year. **Proposed: John Clarkson; seconded: Anna Monro. Carried.**

Meeting closed: 6:00 pm

Attached:

- Minutes of the 2005 Annual General Meeting (Attachment 1)
- Presidents Report (Attachment 2)
- Treasurers Report and audited accounts for year ended 31st December 2005 (Attachment 3)
- Newsletter Report (Attachment 4)

Attachment 1 – Minutes of the 2005 Annual General Meeting

See *Austral. Syst. Bot. Soc. Nsltr* 123: 2-14.

Attachment 2 – President's Report

Welcome to the 28th Annual General Meeting of the Australian Systematic Botany Society. 2005 was a good year for the Society.

The Society has three well established ways of recognising excellence in plant systematics. 2006 is the tenth year that grants have been offered from the Hansjörg Eichler Research Fund. Following on from Council's decision to offer grants twice each year from 2005, this year, the maximum grant was increased from \$1,000 to \$2,000. The job of chairing the research panel falls to the Vice-president. I would like to thank Darren Crayn for the efficient way he embraces this task. I would also like to extend my thanks to the members of the research committee, Barbara Briggs, Rod Henderson, Betsy Jackes, Tom May and Chris Quinn. Not only do we ask these people to assess the applications, we also turn to them for advice when Council is considering changes to the awards. The research fund is now in a very strong position. Over the coming year Darren Crayn will be exploring options of how we might expand the financial support provided from the fund.

Last year in Brisbane I had the very pleasant task of presenting the Nancy Burbidge Medal to Barbara Briggs. The Burbidge Medal recognises long-standing and significant contribution to Australian Systematic Botany. Council invites nominations for candidates for 2006 (see elsewhere in this Newsletter for details). Should one be chosen, the recipient will be announced at the conference in Cairns in November.

The Society is now in its thirty fourth year. That it has survived so long, and gone from strength to strength in that time, is largely down to the outstanding voluntary support received from the membership and from members of Council. In recognition of this, Council is able to honour members who have made a significant contribution to the Society by conferring life membership. The Society currently has two life members, Marlies Eichler and David Symon. Both have strong connections to South Australia. Elsewhere in this Newsletter [p. 14] it will be my pleasure to announce the name of our third life member - yet another South Australian.

Since it was formed in 1973, ASBS has held 30 conferences. Anyone who has been involved in organising a conference would know that it involves a lot of time and effort. Council appreciates the efforts of those who take on this responsibility on behalf of the Society. Wayne

Harris and his team did a splendid job last year in Brisbane. Later this year, Cairns will host the 2006 conference. Paul Gadek of James Cook University is the chairman of the organising committee. Details of the program and registration forms should be available in this newsletter. Council is pleased to confirm that the 2007 conference will be held in Darwin. This will be the first ASBS conference to be held in the Northern Territory. Dale Dixon, an ASBS member from the Northern Territory Herbarium in Darwin, will join Council this year providing an important link between the conference organising committee and Council. The 2011 conference will no doubt be held in association with the IBC in Melbourne. This leaves only 3 time slots to be filled between now and then (2008, 2009 and 2010). There was plenty of enthusiasm to fill these amongst participants at the 2005 Brisbane meeting. Members from Armidale, Hobart, Brisbane and Adelaide have all expressed an interest in hosting conferences.

Retaining long term members and attracting new members is one thing council must continually address. We ended 2005 with 303 members, about the same as 2004. This is in no small measure due to the tremendous job Anna Monro did in following up members who were slow in renewing their subscription or had let their membership lapse. Thanks Anna for all the time you put in in this regard.

Darren Crayn has had some early success in the difficult job of recruiting new chapter conveners. We now have a new chapter in Cairns where Mark Harrington, a postgraduate student at JCU, is the convener. This is a timely appointment with the changes afoot in Far North Queensland. Hannah McPherson, a recipient of a Hansjörg Eichler research grant in 2005, has recently replaced Peter Jobson as convener of the Sydney chapter. Active local chapters can do much to recruit new members. Council thanks all those who take on this task on behalf of the Society. We will be continuing our efforts to breathe new life into some long dormant local groups in the year ahead.

The nomenclatural master class run in 2005 by Dick Brummitt from the Royal Botanic Gardens Kew was a great success. This was well reported in the December Newsletter. Council hopes that master classes of this sort will help fill gaps left in the training of young systematists as botany degrees become more general in content. We also hope they might also be useful in providing

ongoing professional development for the not so young systematists. Following on from Brisbane, Michelle Waycott from James Cook University's Townsville campus has offered to run a master class on *Molecular Tools for Plant Systematics*. This will be held at JCU Cairns immediately following the conference in November. Plans are also afoot to run a masterclass on botanical Latin in Darwin in 2007. These master classes will be jointly hosted by ASBS, CHAH and the host institution for the associated conference. Council encourages members to suggest topics for future master classes and experts in various disciplines who might be persuaded to run them.

The Society continues to enjoy a sound financial position. Having served 4 terms as Treasurer, I know how demanding the job can be. I doubt if any other position on Council demands such constant attention. Our Treasurer, Anna Monro, does a great job. We finished the year with a small but ample surplus in the general account and a surplus in the research fund, which can only be described as incredible for a society the size of ASBS. This is largely due to the outstanding generosity of one benefactor but the fund is also well supported by other members who make smaller donations each year. A long-standing member also informed Council this year that he had made a bequest to the Society in his will. I won't embarrass the member by naming him here, but I do wish to extend Council's appreciation of this gesture. At the same time I would also like to wish him a long and rewarding life.

Council appreciates the effort of the Newsletter editors Bill and Robyn Barker. Bill and Robyn have indicated their willingness to continue as editors for another year – their fifth year. I searched our records and could find no other editors who have stuck with the job as long. I

think you will agree that their enthusiasm does not appear to be waning. The Newsletter remains interesting and informative.

Council has embarked on a project to index all back issues of the Newsletter. The project is being run on several faces. Two Councillors, Marco Duretto and Kirsten Cowley, will index all future issues of the Newsletter as they appear. Thank you to Kirsten and Marco for agreeing to look after this. The published hard copy indices up to Newsletter number 70 have been converted into a digital format that can be searched electronically. Some minor testing needs to be done before they will appear on the web site. The earliest web version of the Newsletter available as full text rather than just as a table of contents is number 106 (March 2001). Council is contacting past editors in the hope of locating as many electronic copies before this as we can. As they are located they will appear on the web site. The final task, if time permits and enthusiasm can be sustained for the project, is to work backwards to scan issues not available in electronic format. This may take some time but Council is keen to see it done. Murray Fagg continues to maintain the Society's web site responding to requests for additions and amendments promptly and efficiently. Thank you Murray.

Before closing, I would like to acknowledge the enthusiasm of all Councillors. They are a great bunch to work with. You can be assured the Society is in good hands. I would especially like to thank Brendan Lepschi. Brendan has served five terms as Secretary and feels it is time for a rest. Thank you and well done Brendan.

John Clarkson
President

Attachment 3 – Treasurer's Report

1. Introduction

It is my pleasure to present the annual financial statement for the year ended 31 December 2005. The finances of the Society are run on the calendar year so the figures being presented are for the year 1 January to 31 December 2005. Anna Monro served as Treasurer for the entire year.

2. Membership

Membership of ASBS continues to hover around the 300 mark, with no significant change from the levels of the last couple of years. The numbers of members in each category has also remained relatively static. The Society may wish to consider ways to attract new members in order to

maintain financial growth and Council has discussed ways to do this. Eight unfinancial members who have not paid their dues since 2003 were written off and five other members resigned during the 2005 financial year. Twenty-four new individual members joined ASBS in 2005 (see list below).

Table 1. ASBS Membership as of 25 March 2006 (unfinancial members bracketed)

Fee	Full	Concessional	Gratis	Total
Ordinary	171 (87)	n/a	0	171 (87)
Student	n/a	48 (29)	0	48 (29)
Retiree	n/a	56 (25)	0	56 (25)
Institutional	11 (3)	n/a	15	26 (3)
Life	n/a	n/a	2	2
Total	182 (90)	104 (54)	17	303 (144)

Approximately 51% of paying members remain unfinancial, a fairly dramatic increase over the 23% in arrears at the last AGM in May 2005. This is unsurprising given that the 2006 AGM is being held two months earlier in the financial year and that the first newsletter for the year (containing subscription forms) has only recently been issued. At the end of 2005 the arrears level was down to around only 10% and it would be good to maintain that. Reminders will thus be sent to the unfinancial portion of the membership shortly after the AGM. As stated last year, **newsletters will no longer be sent to unfinancial members** after 30 June in the year for which they owe arrears.

The following new (or returning) members for 2005 are welcomed to the Society:

- Mr Matthew Barrett, Kings Park & Botanic Garden, Perth, W.A.
- Ms Yean Fern Chong, James Cook University, Qld
- Mr Timothy Curran, University of New England, N.S.W.
- Dr Lyn Cook, Australian National University, A.C.T.
- Dr Gabriel Crowley, Charles Darwin University, N.T.
- Mr Kyatt Dixon, University of Melbourne, Vic.
- Mr Robert Edwards, Australian National University, A.C.T.
- Mr Stuart Gardner, University of Melbourne, Vic.
- Ms Azadeh Haddadchi, University of New England, N.S.W.
- Ms Louise Hucks, AQIS, Smithfield, Qld
- Ms Sally Jacka, Charles Darwin University, N.T.
- Miss Jasmine Janes, University of Tasmania, Tas.
- Ms Lynne Jones, James Cook University, Qld
- Mr Tony Kanellos, Adelaide Botanic Gardens, S.A.
- Ms Raelee Kerrigan, Northern Territory Herbarium, N.T.
- Mr Rob Lamont, University of the Sunshine Coast, Qld
- Ms Claire Marks, University of Melbourne, Vic.
- Dr Merran Matthews, Institute of Systematic Botany, University of Zurich, Switzerland
- Ms Hannah McPherson, National Herbarium of N.S.W., Sydney, N.S.W.
- Mr Matt Renner, University of Sydney, N.S.W.
- Ms Brigitte Stievermann, University of New England, N.S.W.
- Mr Ian Telford, University of New England, N.S.W.
- Ms Gillian Towler, National Herbarium of N.S.W., Sydney, N.S.W.

- Dr Matthew Unwin, Australian National Herbarium, A.C.T.

3. General Fund

Neil Weaver, a Canberra accountant, audited the 2005 books in March 2006. This is the fourth year that Neil has audited the Society's financial statements.

3.1 Income

Income to the General Fund is down on previous years, being only about two-thirds the level of the previous year. This is primarily due to the lack of conference income, as the profits from the November conference in Brisbane was not available until after the end of the 2005 financial year. There was also a decline in investment income, which was partially due to a failure to exploit the best rates for our term deposit. Nonetheless the General Fund finished 2005 with a surplus of \$2201. While the Society does not aim to make a profit on the General Fund, this is a pleasing result given the decrease in income for 2005.

Subscription fees from members were close to the high level achieved in 2004, despite the lack of growth in membership. This is most likely a result of the increase in subscription rates for 2005. As previously mentioned, the number of members in arrears was reduced to about 10% by the end of 2005 and it seems that the arrears drives undertaken over the last two years have paid off. One of the mail-outs in 2005 was an attempt to retrieve "lost" members and as it cost about \$45, only one full-fee paying member was required to re-subscribe in order to cover costs. Several more than this were regained, primarily those without access to e-mail who'd missed previous reminders. It will be interesting to see whether the subscription levels can be maintained for 2006 – this continues to be one of the most time-consuming parts of the Treasurer's job.

Book sales increased again in 2005, mainly due to another fairly large order for newsletter back-issues from an overseas library. However, we still face the problem of dwindling numbers of most of our titles (see Current Assets section below), so it is vital that ASBS look at new publications if we wish to maintain this source of revenue. While book sales don't currently bring in large sums of money, they can provide protection against deficit in years of lower income.

3.2 Expenditure

As mentioned above, some of the payments for the Brisbane conference were made up front and these will not be offset until the 2006 financial year. This was an area with an increase in spending over that in 2004. The Society also paid

two subscription amounts to the Federation of Australian Scientific and Technological Societies (FASTS) in 2005, due to a delay in paying the 2004 dues. These subscription costs will not recur in 2006, as ASBS's membership of FASTS has recently ceased after the twelve month resignation notice period expired. Newsletter printing and postage were again the major expense for the General Fund, although they increased only slightly over those in the previous year. Four newsletters were printed in 2005 with an average cost per issue of around \$1185 (\$1143 in 2004).

The fees and charges associated with the acceptance of credit card payments were slightly less in 2005 than in the initial set-up year, totalling \$230.64. The Society was notified of an increase in the rate it will be charged per transaction from 2.35% to 3.53% as of 1 November 2005, but the effects of this will not be obvious until the 2006 financial year. The rates only apply to months in which fees are over the minimum monthly charge of \$11 in any case and this usually only happens in the first two or three months of the year. Again almost half the payments received in 2005 were made via credit card, with members obviously taking advantage of the convenience. The ability to accept credit cards has definitely made it easier to accept foreign payments for both subscriptions and books. Since the Australian Bankcard is soon to be discontinued and as our credit card processing facility now accepts American Express, the costs of an AMEX merchant account will be investigated for future payments.

Another item relating to fees was the abolition of Bank Accounts Debits Tax (BADT) on 1 July 2005. Prior to this date the Society was charged a fee for every cheque written which varied according to the value of the cheque. This explains the slight decrease in the bank charges in the 2005 financial year and this item should be reduced to zero for 2006. Since these were the only bank fees levied on ASBS and since all external payments are made in the form of cheques, this should represent a modest saving.

3.3 Current Assets in the General Fund

At the end of 2005 the Society held assets of \$54,075 (\$53,354 in cash, \$721 in books). This represents a slight increase over 2004, with the only significant change being the transfer of much of the surplus cash from the general cheque account to the cash management trust.

The books that the Society fully or partially owns, held by Helen Thompson (ASBS sales) and state chapter conveners, as at 31 December 2005 are as follows:

- 49 copies of *History of Systematic Botany in Australasia* (partial share)
- 3 copies of the *Proceedings of the Dampier 2000 conference*
- 14 copies of *Systematic Status of Large Flowering Plant Genera*
- 73 copies of *Evolution of the Flora and Fauna of Arid Australia* (partial share)

4. The Hansjörg Eichler Research Fund

The investment growth for the Research Fund has continued to be very good, with interest increasing overall assets significantly. A total of \$26,265 was earned in interest and distributions during 2005.

All four investment funds for the research account performed better than in the previous financial year. However, it is definitely time to think about reconfiguring some of the investments, given the relatively poor interest rates of the Cash Management Trust compared to those of the other funds. The Treasurer will be discussing this with Council and seeking some financial advice to find the best way to maximise the income for the Research Fund.

Four grants totalling \$4,000 were awarded to students in 2005. These were paid directly from the research cheque account without the need for transfers to the General Fund as in previous years. This certainly makes the book-keeping more straightforward.

Net assets increased from \$242,790 to \$286,035 in the twelve months ended 31 December 2005, with most of the Research Fund's surplus coming through members' generous donations. This continued growth enabled us to cover the expenses of a second round of grants in 2005 and the maximum grant amount will increase to \$2000 as of the March 2006 round. The diversification and performance of the Research Fund enables the Society to continue supporting research in plant systematics by early-career scientists.

5. Taxation

The ASBS continues with its tax-exempt status. Organisers of conferences are reminded that ASBS is not registered as a GST gathering organisation. Planners of large conferences need to obtain an ABN and the relevant status or work through a registered institution (such as a herbarium). The recent conference in Brisbane was run in this manner for the most part. Smaller conferences and workshops can be run through the Society as long as no GST is charged or recovered.

The amounts of tax file number withholding tax charged on the Colonial First State diversified

fund were recovered from Colonial and the ATO during 2005, a total of \$1509. Distributions since July 2005 have been tax-free after the provision of our ABN.

6. Summary

General Fund spending was kept relatively low in 2005 but income was also down on previous years. This was partially due to conference income being deferred until 2006. The increased subscription rates in 2005 helped keep the General Fund in surplus, but there is still a need to maintain income levels. I plan to investigate investment options for the General Fund – while it is necessary to keep some of the money at call, it seems likely we could be earning better interest on the remainder. The term deposit for example requires reinvesting at differing terms to follow the best interest rate but it may be possible to earn similar or better interest with a more convenient form of investment without significantly greater risk. We need to be able to cover the up-front costs of the upcoming Cairns

conference with money from the General Fund, and any increase in income would be useful for this. The Eichler Fund continues its strong growth and has allowed us to increase both the amount and frequency of grants given to students to maintain the objectives of the Society.

I would like to convey my thanks to Council for their helpful input on financial matters over the preceding twelve months. I've also enjoyed my continued contact with members, who've all remained polite even when being hounded for arrears! There are still several areas of the ASBS finances that I feel can be improved, which I'll be looking into now that the first rush of subscriptions for the year is coming to an end. I hope to be able to successfully manage the finances of the Society for the coming year and to see a continuation of the growth experienced in 2005.

Anna Monro
Honorary Treasurer

AUSTRALIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

COUNCIL MEMBERS' REPORT

Your Council members submit the financial statement of the Australian Systematic Botany Society Incorporated for the financial year ended 31 December 2005.

Council Members

The names of the Council members who held office throughout the year and at the date of this report are:

President	Steve Hopper	Term ended May 2005
President	John Clarkson	Appointed May 2005
Vice President	John Clarkson	Term ended May 2005
Vice-President	Darren Crayn	Appointed May 2005
Secretary	Brendan Lepschi	
Treasurer	Anna Monro	
Councillors	Marco Duretto	
	Darren Crayn	Term ended May 2005
	Kirsten Cowley	Appointed May 2005

Public Officer

Kirsten Cowley

Principal activities

The principal activities of the association during the year were to promote systematic botany in Australia.

Significant changes

No significant change in the nature of these activities occurred during the year.

Operating results

The operating results are as set out hereunder:

	March 2006	2005	2004	2003
	\$	\$	\$	\$
Research Fund		43,245.62	36,842.38	20,454.78
General Fund		2,201.78	12,810.28	355.86
Total	n.av.²	45,447.40	49,652.66	20,810.64

Signed in accordance with a resolution of the members of the Council.

John Clarkson (President)

Anna Monro (Treasurer)

22 March 2006

STATEMENT OF INCOME AND EXPENDITURE
2003–2005 (audited figures) and to March 2006
RESEARCH FUND

	March 2006	2005	2004	2003
Income				
Donations to Research Fund		\$20,000.00	\$20,000.00	\$20,000.00
Investment Income	n.av.	\$26,265.02	\$20,002.38	\$6,751.68
General Fund Transfer		\$982.00		\$1,038.30
		\$47,247.02	\$40,002.38	\$27,789.98
Expenditure				
Research Grants	\$0.00 ³	\$4,000.00		
Loss on Bonds and Growth Funds	n.av.			
Investment Entry Fees	\$0.00		\$580.00	\$2,200.00
Bank Charges	n.av.	\$1.50		\$25.20
General Fund Transfer	\$0.00		\$2,580.00	\$5,110.00
		\$4,001.50	\$3,160.00	\$7,335.20
Surplus (-Deficit) for year		\$43,245.52	\$36,842.38	\$20,454.78

STATEMENT OF INCOME AND EXPENDITURE
2003–2005 (audited figures) and to March 2006

GENERAL FUND

	March 2006	2005	2004	2003
Income				
Sales				
Books	\$43.50	\$549.35	\$353.47	\$117.20
	\$43.50	\$549.35	\$353.47	\$117.20
Less Cost of Goods Sold				
Opening stock - books	n.av.	\$784.25	\$914.25	\$1,374.25
Closing stock - books	n.av.	-\$721.07	-\$784.25	-\$914.25
Cost of Goods Sold		\$63.18	\$130.00	\$460.00
Gross Surplus from Trading		\$486.17	\$223.47	-\$342.80
Advertising	\$0.00	\$125.00	\$500.00	
Conferences	\$3803.28 ⁴		\$4,115.00	\$5,050.00
Investment income	n.av.	\$1,947.89	\$2,794.01	\$1,348.76
Subscriptions to ASBS Inc	\$5246.00	\$10,380.00	\$10,450.00	\$7,005.86
Donations Eichler Fund	\$570.00	\$1,222.00	\$1,190.00	\$530.00
Transfer Ex Research Fund	\$0.00		\$2,580.00	
Transfer Ex Cash Management				
Account	\$0.00			\$5,110.00
Sundry income	\$0.00		\$33.00	\$10.00
Total Income		\$14,161.06	\$21,885.48	\$18,711.82

² Not available. Since accounts for 2006 are not complete many figures are unavailable.

³ No grants as yet awarded in 2006; March round applications are currently under review.

⁴ Return of BRI conference profits and reimbursement by CHAH of \$1500 pre-payment to Dick Brummitt.

GENERAL FUND (c ontinued)

Expenditure				
Transfer of Member donations to Eichler	\$0.00	\$982.00		\$1,038.30
Auditors remuneration	\$0.00	\$900.00	\$700.00	\$700.00
Bank fees	\$0.00	\$20.70	\$32.60	\$67.60
Credit Charge Facility	\$71.09	\$230.64	\$254.14	
Conference expenses	\$0.00	\$3,551.35	\$927.92	\$1,629.75
Meet the scientists workshop	\$520.54 ⁵		\$450.00	\$198.00
Eichler Award Students	\$0.00		\$2,000.00	\$4,980.00
Student conference participation	\$308.00 ⁶			\$900.00
Newsletter expenses	\$963.14 ⁷	\$4,741.22	\$4,571.84	\$5,364.49
Royalties - history book sales	\$0.00			\$1,088.77
Subscriptions (FASTS)	\$0.00	\$1,150.90		\$2,211.00
Mail outs	\$0.00	\$245.32		
Registrar general returns	\$0.00	\$28.00	\$54.00	\$105.00
Miscellaneous Expenses (eg. postage)	\$0.00	\$109.15	\$84.70	\$73.05
Cheque Account Transfer				
Total Expenditure		\$11,959.28	\$9,075.20	\$18,355.96
Surplus (-Deficit) For Year		\$2,201.78	\$12,810.28	\$355.86

BALANCE SHEET
2003–2005 (audited figures) and to March 2006

	March 2006	2005	2004	2003
Current Assets				
Cash and Investments				
Research Fund				
Cash at Bank	\$941.23	\$941.23	\$938.09	\$20,897.47
Investments				
Colonial Managed Investment	n.av. ⁸	\$68,781.61	\$60,213.81	\$52,922.01
Cash Management Fund	n.av.	\$81,635.27	\$60,224.84	\$20,455.71
Australian Bond Fund	n.av.	\$69,163.17	\$65,720.49	\$61,958.74
Growth Fund	n.av.	\$65,514.55	\$55,693.08	\$48,564.48
		\$286,035.83	\$242,790.31	\$204,798.41
General Fund				
Cash at bank	\$11,914.69	\$3,811.78	\$14,308.37	\$3,710.42
Investments				
Term Deposit	\$10,000.00	\$10,000.00	\$10,000.00	\$10,000.00
Cash Management Account	n.av.	\$39,541.96	\$26,780.41	\$25,587.60
		\$53,353.74	\$51,088.78	\$39,298.02
Inventories				
General Fund				
Books	n.av.	\$721.07	\$784.25	\$914.25
Total Current Assets		\$340,110.64	\$294,663.34	\$245,010.68
Net Assets		\$340,110.64	\$294,663.34	\$245,010.68
Members' Funds				
Research Fund				
Accumulated surplus at year end		\$285,440.77	\$242,195.25	\$205,352.87
		\$285,440.77	\$242,195.25	\$205,352.87
General Fund				
Accumulated surplus at year end		\$54,669.87	\$52,468.09	\$39,657.81
Total Members' Funds		\$340,110.64	\$294,663.34	\$245,010.68

⁵ Reimbursement of Clarkson airfares to Canberra March AGM.

⁶ Reimbursement of BRI conference registration fee for seven presenting student members.

⁷ Printing and postage for issue #125.

⁸ These accounts receive quarterly statements, so the March balances are not yet available.

1. Statement of Significant Accounting Policies

This report is a special purpose financial report in order to satisfy the financial reporting requirements of the Associations Incorporation Act (ACT). The Council has determined that the association is not a reporting entity.

The financial report has been prepared in accordance with the requirements of the Associations Incorporation Act (ACT).

No Australian Standards, Urgent Issues Group Consensus Views or other authoritative pronouncements of the Australian Accounting Standards Board have been intentionally applied.

The financial report has been prepared on an accruals basis and is based on historic costs and does not take into account changing money values, or except where specifically stated, current valuations of non-current assets.

The following specific accounting policies, which are consistent with the previous period unless otherwise stated, have been adopted in the preparation of this financial report.

(a) Membership

Membership is recorded on a cash basis.

(b) Income Tax

Under present legislation the association is exempt from income tax accordingly no provision has been made in the accounts.

(c) Asset Revaluation Reserve

In prior years the movement in the Bond and Growth Funds have been recorded as asset revaluations. In 2001, management have decided to recognise these movements as income. The balance of the asset revaluation reserve was transferred to income in the 2001 year.

(d) Comparative Figures

Where required by Accounting Standards comparative figures have been adjusted to conform with the changes in presentation for the current year.

(e) Members Funds

In accordance with the rules of the association accumulated funds are not available for the distribution to members.

	2005	2004	2003
2. Investment Income			
Research Fund			
Interest Received			
Cheque Account	\$4.64	\$47.42	\$2.22
Distributions			
Colonial First State	\$9,799.80	\$7,871.80	\$122.01
Cash Management Trust	\$3,196.43	\$1,192.81	\$2,674.45
Australian Bond and Growth Fund	\$13,264.15	\$10,890.35	\$3,953.00
Total Research Fund	\$26,265.02	\$20,002.38	\$6,751.68
General Fund			
Interest Received			
Cheque Account	\$61.34	\$15.23	\$11.12
Term Deposits	\$125.00	\$429.65	\$355.06
	\$186.34	\$444.88	\$366.18
Distributions			
Cash Management Trust	\$1,761.55	\$2,349.13	\$982.58
Total General Fund	\$1,947.89	\$2,794.01	\$1,348.76
Overall Investment Income	\$28,212.91	\$22,796.39	\$8,100.44

3. Accumulated Funds

Research Fund			
Accumulated Surplus start	\$242,195.25	\$205,352.87	\$184,898.19
Surplus/ (Deficit) this year	\$43,245.52	\$36,842.38	\$20,454.68
Accumulated Surplus end	\$285,440.77	\$242,195.25	\$205,352.87
General Fund			
Accumulated Surplus start	\$52,468.09	\$39,657.81	\$39,301.95
Surplus/ (Deficit) this year	\$2,201.78	\$12,810.28	\$355.86
Accumulated Surplus end	\$54,669.87	\$52,468.09	\$39,657.81
Total Accumulated surplus end	\$340,110.64	\$294,663.34	\$245,010.68

4. Research Committee

The Australian Systematic Botany Society is an approved research institute.
The approved membership of the Research Committee comprises:

Barbara Briggs	Appointed July 2003
Rod Henderson	Appointed July 2003
Betsy Jackes	Appointed July 2003
Chris Quinn	Appointed July 2003
Tom May	Appointed July 2003

AUSTRALIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

Statement by Members of the Council

In the opinion of the council the financial report as set out on pages 1 to 7:

1. Presents fairly the financial position of the Australian Systematic Botany Society Inc. as at 31 December 2005 and its performance for the year ended on that date.
2. At the date of this statement, there are reasonable grounds to believe that Australian Systematic Botany Society Inc. will be able to pay its debts as and when they fall due.

This statement is made in accordance with a resolution of the Council and is signed for and on behalf of the Council by:

President: John Clarkson
Treasurer: Anna Monro
Dated this 22nd day of March 2006

INDEPENDENT AUDIT REPORT TO THE MEMBERS OF THE AUSTRALIAN SYSTEMATIC BOTANY SOCIETY

Scope

I have audited the special purpose financial statements of The Australian Systematic Botany Society Inc. (the Society) for the financial year ended 31 December 2005. The Committee members are responsible for the preparation and presentation of the special purpose financial statements and the information they contain. I have conducted an independent audit of these special purpose financial statements in order to express an opinion on them to the members of the Society.

The audit has been conducted in accordance with the Australian Auditing Standards to provide reasonable assurance as to whether the special purpose financial statements are free of material misstatement. My procedures included examination, on a test basis, of evidence supporting the amounts and other disclosures in

the special purpose financial statements, and the evaluation of accounting policies and significant accounting estimates. These procedures have been undertaken to form an opinion as to whether, in all material respects, the financial statements are presented fairly in accordance with Australian Accounting Standards, other mandatory professional reporting requirements and relevant statutory requirements and other requirements, in Australia so as to present a view which is consistent with my understanding of the Society's financial position and the results of its operations.

The audit opinion expressed in this report has been formed on the above basis.

Qualification

As is common for organizations of this type, it is not practicable for the Society to maintain an effective system of internal control over the

receipt of revenues until their initial entry in the accounting records. Accordingly, my audit was limited to the amounts recorded.

Qualified Audit Opinion

Subject to the above qualification, in my opinion:

- a) The special purpose financial statements of the Australian Systematic Botany Society Inc are properly drawn up:
 - i) so as to give a true and fair view of the assets and liabilities of the Society as at 31 December 2005 and the income and expenditure of the Society for the financial year ended on that date and the other matters required by Subsection 72(2) of the Associations Incorporation Act to be dealt with in the financial statements;

- ii) in accordance with the provisions of the Associations Incorporation Act; and
- iii) in accordance with proper accounting standards.
- b) I have obtained all the information and explanations which to the best of my knowledge and belief were necessary for the purpose of the audit; and
- c) Proper accounting records and other records have been kept by the Society as required by the Act.

Neil Weaver
Registered Company Auditor
PO Box 965
DICKSON ACT 2602
23rd March 2006

Attachment 4 – Newsletter Report

Bill and Robyn Barker have continued editing of the *Austral. Syst. Bot. Soc. Newsletter* since the last AGM in May 2005. Three issues, 123-125, have been published, with 126 in preparation.

As in previous years there has been no lack of material for the Newsletter and we thank all of those who have provided input, particularly those who regularly do so. We continue to encourage use of the newsletter by members and it is pleasing to note that there has been an increase in the reporting of news from the various states – but there is still room for improvement.

We would also like to include abstracts of theses which have been examined and accepted in the newsletter. This is one way that students can bring their work to the attention of other systematists, while keeping the membership aware of work being done.

As always, we are open to suggestions and if you have any comments on the newsletter and how it might be improved, then please contact us.

Robyn & Bill Barker
March 2006

Hansjörg Eichler Research Fund report

Three applications were received for the current (March 2006) round. These are now under review by the Eichler committee. The results of this process will be reported in the next issue. As announced in the previous newsletter the maximum grant has been raised to \$2000 due to the strong performance of the investments and the continued support of a generous benefactor. The closing dates for applications for the two rounds remain March 14 and September 14 each

year. Reports by David Maynard and Hannah McPherson, recipients in 2004 and 2005 respectively, follow in this issue. As always, the expertise and enthusiasm of the Eichler committee (Barbara Briggs, Rod Henderson, Betsy Jackes, Tom May, Chris Quinn) in reviewing grant proposals is greatly appreciated.

Darren Crayn
Eichler Research Fund Committee Chair

Life Membership awarded to Robyn Barker

The Australian Systematic Botany Society is pleased to announce Council's decision to confer life membership on Robyn Barker for her substantial and continuing contribution to the Society at both chapter and national level. Life membership may be conferred by Council on any member who has, in the opinion of Council, made a significant contribution to the Society. Such are the high standards demanded of this award, that to date, the Society has honoured only two members in this way - Marlies Eichler in 1998 and David Symon in 2000.

Robyn has been stalwart of the Adelaide chapter. In November 1973, just after attending the inaugural meeting of the Australian Systematic Botany Society in Melbourne, she was one of eighteen people who gathered at the home of David Symon to discuss the formation of a South Australian chapter. Alone, or in partnership with husband Bill or others, she served as convener of this chapter for all but 2 years from 1988 to 2000. In 2001 meetings of the chapter were suspended from lack of numbers attending but Robyn continues as the Society's principal contact in South Australia.

Figures. Top, Robyn telling it how it is in the State Herbarium of South Australia vaults. Above, introducing the Blackberry ID tool to SA Weeds Officers, and Tim Rudman and Sarah Keel, respectively Tasmanian and National Blackberry Taskforce representatives (at meeting of Taskforce at the State Herbarium, Adelaide, 2005). Below, telling Friends of Botanic Gardens of Adelaide guides about South Australia's *Electronic Flora* and the *Australia's Virtual Herbarium*, 2005. Photos: Bill Barker



Elected to Council in 1996, Robyn served one year as a Councillor before accepting the role of Secretary. She handled this task efficiently and with much enthusiasm until 2002 when, having served the maximum 6 full terms as a member of Council, she was required by the Society's rules to stand down. Not one to have a well earned rest from Society matters, she immediately took on the role of Newsletter editor in partnership with her husband Bill. Her contribution begins with issue number 108. The Barkers have just announced their willingness to continue as editors for another year. This will be their fifth year. No other editors have stuck with the job for so long.

Robyn was a member of the Council which secured approved research institute status for the Hansjörg Eichler Research Fund. She served as a member of the first Hansjörg Eichler Research Committee. In that capacity she helped draft the selection criteria that remain essentially unchanged today and participated in the selection of the successful candidates for the first grants from the fund. She served on the committee until 2002.

Robyn is a keen supporter of ASBS conferences and it would be an unusual not so see her (and husband Bill) at the annual conference wherever it was held. She was a key supporter of the Society's national celebration of the 200th anniversary of the Flinders and Baudin

expeditions. Her enthusiasm, interest and knowledge were much to the fore, particularly in South Australia, where she helped publicise the importance of these voyages of discovery to Australian botany and organised a number of significant events.

I am sure that members will agree that this is an honour well earned and well deserved.

John Clarkson
President

Criteria for ASBS Award nominations

Life Membership

Nominations for life membership of the Australian Systematic Botany Society can be made at any time. The award is conferred by Council on any member who has, in the opinion of Council, made a significant contribution to the Society. Nominees must be proposed and seconded by two financial members of the Society. Nominations shall include a statement

outlining the contribution of the nominee to the Society. The rules permit no more than 10 life members at any time and allow life membership to be conferred on no more than 2 persons in any one year. Life members are exempt from the payment of annual fees but retain the rights and privileges of a financial member. Nominations should be sent to the Secretary marked private and confidential.



Fig. Members of the 2005 and 2006 ASBS Councils. Standing: Kirsten Cowley, Anna Monro, Marco Duretto, Dale Dixon, Seated: Brendan Lepschi, John Clarkson, Darren Crayn. Ph. J. Clarkson

Nancy Burbidge Medal

Nominations for the award of the Nancy Burbidge Medal can be made at any time. The award is made to a person who has made a substantial contribution to Australian systematic botany. The award is not necessarily made each year. Nominees need not be members of the Australian Systematic Botany Society but must be proposed and seconded by two financial members of the Society. Nominations shall

include a statement outlining the contribution of the nominee to Australian systematic botany, a curriculum vitae and the names of 2 referees. The award is made by the Australian Systematic Botany Society on the recommendation of Council. Nominations should be sent to the Secretary marked private and confidential.

John Clarkson
President

Welcome to new members in 2006

Council is pleased to welcome the following new members for 2006 to the Society:

- Ms Waipana Awarau, AQIS Mareeba/James Cook University, Qld.
- Ms Bronwyn Collins, Australian National Herbarium, Canberra, A.C.T.
- Mr Gavin Duley, University of New England, N.S.W.
- Mr Daniel Healy, Queensland Herbarium, Qld.
- Ms Liz James, Royal Botanic Gardens Melbourne, Vic.
- Dr Kristina Lemson, School of Natural Sciences, Edith Cowan University, W.A.
- Ms Emma Lewis, School of Botany, University of Melbourne, Vic.
- Mr Carlos Parra-Osorio, School of Botany, University of Melbourne, Vic.
- Mr Alan Watterson, Mullumbimby, N.S.W.

Anna Monro
Treasurer

Puzzle answer

The quote about the avocado in the previous issue came from William Dampier's 1697 *A New Voyage Round the World*; it is available on the web at www.gutenberg.net.au/ebooks05/0500461h.html

Eichler Research Fund reports

A molecular phylogeny for Australian *Elaeocarpus* (Elaeocarpaceae) and the affinities of a putative new taxon

David J. Maynard

School of Biological, Earth and Environmental Sciences, University of New South Wales,
Kensington, NSW 2032
Botanic Gardens Trust, Mrs Macquaries Road, Sydney, NSW 2000

This article reports the main findings from an Honours study (undertaken in 2004 at the University of New South Wales and Botanic Gardens Trust, Sydney) of morphological and molecular variation in Australian *Elaeocarpus*. The primary aim was to assess the taxonomic status and affinities of a putative new species known from a few small populations in the Nightcap Range area of north-eastern New South Wales.

The Elaeocarpaceae (as traditionally defined, i.e. excluding Tremandraceae) is a family of mainly tropical and sub-tropical trees or shrubs with centers of diversity in the Indo-Malayan and Australia-Pacific regions. Within Australia the family is represented by the genera *Aceratium*, *Aristotelia*, *Dubouzetia*, *Elaeocarpus*, *Peripentadenia*, and *Sloanea* which occur in all states except Western Australia and South Australia. The largest of these genera, *Elaeocarpus*, has over 30 species in Australia (at least 5 undescribed) and between 300-500 worldwide (Coode, 1978; 1984).

Infrageneric sections for *Elaeocarpus* were first proposed by Schlechter (1916). The informal groups developed by Coode (1978) for Papuan *Elaeocarpus* are largely based upon this and other previously published classifications (e.g. Schlechter, 1916;

Smith, 1942; Weibel, 1968) and uses the embryo and floral characters defined in these accounts. Coode proposed that the selected characters would potentially reflect relatedness within the genus. The 9 groups initially proposed for Papuan specimens were later modified somewhat to include the Australian and New



Fig. 1. Leaves and flowers of *Elaeocarpus* sp. 'Rocky Creek'
Fig. 2. Fruits of *Elaeocarpus* sp. 'Rocky Creek' with the exocarp removed showing the mesocarp of dense fibres which are persistently attached

Ph. M. Rossetto.
Ph. D. Maynard

Zealand species (Coode, 1984). Most of the Australian species fit well within the existing Papuanian groups, although unique characters are introduced by *E. holopetalus*, *E. grahamii* and *E. obovatus*. The inclusion of these and other Australian species expanded the number of informal groups to 12. Group IV was expanded to include *E. johnsonii* mostly due to this taxon exhibiting a radially fibrous mesocarp which is an uncommon character within the genus (Coode, 1984). *Elaeocarpus blepharoceras*, the sole Papuanian member of group IV, also possesses the characteristic radially fibrous mesocarp and introduces an unusual character: closely fissured bark. This combination of characters is not known elsewhere in *Elaeocarpus*, excluding the putative Australian taxon *E. sp. 'Rocky Creek'* (Figs. 1 and 2). *Elaeocarpus sp. 'Rocky Creek'* (also known as *E. sp. 'Minyon'*) has a highly restricted distribution (<50km²) on the Mount Warning Caldera in north eastern NSW where it is known from a few disjunct populations comprising between 3 and approx. 400 individuals. Similarities between *E. sp. 'Rocky Creek'* and *E. blepharoceras* were noted in Coode's 1984 treatment but insufficient material available at the time prevented further analysis. Investigations from this study have revealed that *E. sp. 'Rocky Creek'* exhibits many other morphological similarities to *E. blepharoceras* including leaf size, shape and discolouration, highly divided petal apices and similarly awned anthers.

Although considerable taxonomic work has been conducted on *Elaeocarpus* and other genera within Elaeocarpaceae relatively little effort has been directed at resolving phylogenetic relationships between or within these groups. Previous cladistic studies based on morphological characters have proposed generic relationships within the family (Coode, 1987) and at the specific level within *Crinodendron*, *Dubouzetia* and *Aristotelia* (Coode, 1985, 1987). To date, no analysis of generic relationships in the family using molecular data has been published, although several higher level studies (e.g. Savolainen *et al.*, 2000, Bradford and Barnes, 2001) have included some representatives of the family. Furthermore, Coode's morphological studies have not been followed up with more detailed work to confirm species relationships or enable placement of the unresolved taxa.

Firstly, this study aimed to produce a molecular phylogeny for *Elaeocarpus* in Australia to test the previous morphological treatments and identify genetic relatedness within the genus. Secondly, it aimed to identify morphological similarities and differences between *E. sp.*

'Rocky Creek' and *E. blepharoceras* to determine the appropriate taxonomic treatment of *E. sp. 'Rocky Creek'*. I was awarded \$1000 from the Hansjörg Eichler Scientific Research Fund to assist in the costs associated with gathering molecular data for the first component of my project.

The ITS region of nuclear ribosomal DNA (including ITS1, 5.8s and ITS2) was amplified and sequenced for 32 species of *Elaeocarpus* representing all informal groups of the Australian *Elaeocarpus* except group X (10) and included 8 exotic species. Three species of *Aceratium*, one of *Sericolea* and two of *Peripentadenia* were included to assess generic boundaries among *Elaeocarpus* and its closest allies. Phylogenetic relationships were resolved using maximum likelihood and maximum parsimony analyses in PAUP* (Swofford, 1998).

For the morphological analysis 11 individuals of *E. blepharoceras* and 9 of *E. sp. 'Rocky Creek'* were scored for 31 continuous vegetative and reproductive characters. The dataset was analysed using the pattern analysis package (PATN) (Belbin, 1993) in which cluster and ordination analyses were performed on the untransformed data.

As a result of this study the higher relationships among most of the Australian *Elaeocarpus* have been inferred with good support on the basis of ITS sequence data. Many of the clades concord with the major infrageneric groups suggested by Coode (1978, 1984) supporting his theory of selected morphological characters reflecting relatedness within the genus. Members of group V formed well supported sister clades and subgroups within these clades were also well supported. Group VI, Group VII and Group VIB were also strongly supported in this analysis as was the majority of group XIB. Group VII and XI are placed closely in Coode's (1984) key to groups and are shown to be closely related based on the ITS data.

PCR amplification of *Elaeocarpus sp. 'Rocky Creek'* produced multiple fragments, which were cloned via bacterial vector. Phylogenetic analysis resolved two distinct well supported clades of *E. sp. 'Rocky Creek'* clones suggesting the presence of paralogous copies of the ITS region within this taxon. Although nuclear ribosomal DNA repeats are thought to evolve in concerted evolution, some genomes can contain a considerable diversity of paralogous rDNA (Buckler *et al.*, 1997).

Both clades of *E. sp. 'Rocky Creek'* clones diverged basally on the ITS trees, appearing

sister to not only the sampled *Elaeocarpus* but also to sampled individuals of *Aceratium* and *Sericolea*. Although this pattern is unsupported it raises questions about the relative age of this lineage and its appropriate generic placement. Its occurrence in northern NSW, which is towards the southern end of the global distribution of the genus, is consistent with a hypothesised southern origin of the genus (Dettman and Clifford, 2000). *Elaeocarpus* sp. 'Rocky Creek' fails to associate with the Australian group IV member *E. johnsonii* although it shows morphological similarities with the Papuan group IV species *E. blepharoceras*. Unfortunately *E. blepharoceras* failed to amplify from the material available and was not present in the molecular analysis for further comparison.

The results of the morphometric analysis clearly identified three distinct entities that may warrant taxonomic recognition. There was greater similarity between the lowland group of *E. blepharoceras* and *E. sp.* 'Rocky Creek' than there was between the lowland and highland groups of *E. blepharoceras* which raises questions regarding the historical distributions of these taxa. It is possible that the small isolated populations of *E. sp.* 'Rocky Creek' are relicts of a once more continuous distribution of an ancient, stable, highly conserved morphotype that extended at least from northern New South Wales into New Guinea.

A significant extrinsic character which is likely to influence decisions regarding the taxonomic level at which these taxa are recognized is their current geographic distribution. Currently no molecular data for *E. blepharoceras* is available so the molecular systematics and population structure of this species cannot be determined. Further molecular and morphological analysis across the range of this species is required to confidently recommend divisions within *E. blepharoceras*. Population genetic studies indicate extremely low rates of gene flow between populations of *E. sp.* 'Rocky Creek' that are separated by as few as five kilometers and two rivers (Rossetto *et al.*, 2004). Consequently it is very unlikely that there is an exchange of genetic information between this taxon and *E. blepharoceras* of which the closest population is over two thousand kilometers to the north. Although *E. sp.* 'Rocky Creek' exhibits unusual characters within *Elaeocarpus* it also shares a number of characters in common. Until relationships among *Aceratium*, *Elaeocarpus* and *Sericolea* can be confidently resolved it would seem reasonable to describe *E. sp.* 'Rocky Creek' as a new species within *Elaeocarpus*. The

results of this study, including a description of the species, are currently being prepared for publication.

Acknowledgments

I would like to express my sincere thanks to the Australian Systematic Botany Society for the financial support provided through the Hansjörg Eichler Scientific Research Fund. The funding allowed me to complete my project to a detail that would have otherwise have not been possible. I would also like express great thanks to my supervisors Darren Crayn and Maurizio Rossetto and to all at the Botanic Gardens Trust in Sydney for their enthusiastic and invaluable support and assistance throughout my study.

References

- Belbin L (1993) 'PATN analysis package. Users' and technical reference manuals', CSIRO Division of Wildlife and Ecology, Canberra.
- Bradford, J. C. and Barnes, R. W. (2001) Phylogenetics and classification of Cunoniaceae (Oxalidales) using chloroplast DNA sequences and morphology. *Systematic Botany* **26**, 354-385.
- Buckler, E. S., Ippolito, A. and Holtsford, T. P. (1997) The evolution of ribosomal DNA: divergent paralogues and phylogenetic implications. *Genetics* **145**, 821-832.
- Coode, M. J. E. (1978) A conspectus of *Elaeocarpus* in Papuasias. *Brunonia* **1**, 131-298.
- Coode, M. J. E. (1984) *Elaeocarpus* in Australia and New Zealand. *Kew Bulletin* **39**, 509-586.
- Coode, M. J. E. (1985) *Aristotelia* and *Vallea*, closely related in Elaeocarpaceae, *Kew Bulletin* **40**, 479-507.
- Coode, M. J. E. (1987) *Crinodendron*, *Dubouzetia* and *Peripentadenia*, closely related in Elaeocarpaceae. *Kew Bulletin* **42**, 777-814.
- Dettmann, M. E. and Clifford, H. T. (2000) The fossil record of *Elaeocarpus* L. fruits. *Memoirs of the Queensland Museum* **46**, 461-497.
- Rossetto, M., Jones, R. and Hunter, J. (2004) Genetic effects of rainforest fragmentation in an early successional tree (*Elaeocarpus grandis*). *Heredity* **93**, 610-618.
- Schlechter, R. (1916) Die Elaeocarpaceen Papuasien. In C. Lauterbach, 'Beiträge zur Flora von Papuasien' V. *Botanische Jahrbucher* **54**, 92-155.
- Smith, A. C. (1942) Studies on Papuanian plants. VI. *Journal of the Arnold Arboretum* **25**, 104-121, 222-298.
- Savolainen, V., Fay, M. F., Albach, D. C., Backlund, A., van der Bank, M., Cameron, K. M., Johnson, S. A., Lledo, M. D., Pintaud, J. C., Powell, M., Sheahan, M. C., Soltis, D. E., Soltis, P. S., Weston, P., Whitten, W. M., Wurdack, K. J., and Chase, M. W. (2000) Phylogeny of the eudicots: A nearly complete familial analysis based on *rbcL* gene sequences. *Kew Bulletin* **55**, 257-309.
- Swofford, D. L. (1998) PAUP*: phylogenetic analysis using parsimony (* and other methods). Sunderland, Massachusetts, USA, Sinauer Associates Inc.
- Weibel, R. W. (1968) Morphologie de l'embryon et de la graine des *Elaeocarpus*. *Candollea* **23**, 101-108.

Molecular systematics of *Tetratheca* and allies

Hannah McPherson

Ecosystem Management, University of New England, Armidale, NSW 2351
Botanic Gardens Trust, Mrs Macquaries Road, Sydney 2000

Project Outline

Tetratheca, *Tremandra* and *Platytheca* (formerly Tremandraceae) are small woody shrubs distributed in relatively open and mostly dry habitats. Recent research places these three genera within Eleocarpaceae (e.g. Savolainen *et al.* 2000; Crayn *et al.* in press), a widespread family of rainforest trees and shrubs. *Platytheca* and *Tremandra* (two species each) occur only in south-western Australia, whereas *Tetratheca* (41-46 species) occurs widely throughout the south-western and south-eastern parts of the continent. A new species, *Tetratheca fordiana* has recently been described from the Pilbara region in Western Australia (Butcher and Sage, 2005). None of the species of *Tetratheca* spans both western and eastern states (Thompson 1976; Alford 1995; Jeanes 1996) and there is a distinct absence of taxa from the Great Australian Bight. Two species of *Tetratheca* are endemic on Kangaroo Island: *T. halmaturina* shows morphological similarity to a leafless species, *T. harperi*, from outback Western Australia; *T. insularis* is similar to the eastern species *T. pilosa*.

In Thompson's 1976 revision of *Tetratheca*, it was argued that "The greater number of characters in Western Australia, as well as the presence of two other genera sharing some of these characters points to a western origin [of the former Tremandraceae]".

Thompson's treatment provides a solid morphological basis for understanding the taxonomy of this group, but as she pointed out there are problems in the delimitation of some species complexes and relationships between species of *Tetratheca* remain "...puzzling and the evolutionary trends are obscure" (Thompson 1976). Further, since her treatment several new taxa have come to light (Alford 1995; Jeanes 1996; Butcher *et al.* in prep.; Butcher and Sage 2005). A morphometric analysis of the genus (Downing 2004) provides a comparative framework for the assessment of molecular relationships, which is the subject of my Masters research. The first part of this research is to infer a molecular phylogeny for the former Tremandraceae based on plastid *trnL-F* and nuclear *ITS* data. These data will be used to investigate cladistic biogeographical relationships, and to date divergences. The second will be to undertake a phylogeographic study, using microsatellite flanking region analysis, to elucidate relationships at the species

level and below for some species complexes within the group.

Hansjörg Eichler Scientific Research Fund component

With the Hansjörg Eichler Research Fund and in kind support from the Botanic Gardens Trust I conducted a field trip with Darren Crayn to collect *Tetratheca* from Kangaroo Island and the Fleurieu Peninsula of South Australia. (Figs. 1, 2). Phil Pisanu from the Department of Environment and Heritage kindly assisted us on Kangaroo Island. His local knowledge made for a very productive couple of days. In total we collected up to 20 samples from each of 7 populations of *Tetratheca halmaturina* and 6 populations of *T. insularis* from Kangaroo Island. Four populations of *Tetratheca pilosa* subsp. *pilosa* and one of *T. ciliata* were sampled from the nearby mainland. Vouchers will be lodged, once processed, at the National Herbarium of New South Wales and the State Herbarium of South Australia.

These population samples will provide an excellent opportunity to further explore some of the more perplexing systematic and evolutionary questions in *Tetratheca*. Elucidation of the phylogenetic relationships of the Kangaroo Island species will provide a critical component to understanding the evolution and historical biogeography of *Tetratheca* because Kangaroo Island is the only place where the ranges of species with putative western and eastern affinities overlap. Also, the presence of two *Tetratheca* species on an island whose age of separation from the mainland is well constrained allows, in conjunction with dated molecular phylogenies, testing of hypotheses of dispersal capabilities in *Tetratheca*. This is critical for developing credible historical biogeographic scenarios for the genus.

Study of the population genetic structure within *T. insularis* and between this species and the remainder of the *T. pilosa* group (*T. pilosa*, *T. gunnii*, *T. neglecta*, *T. rubioides*, *T. procumbens*) will help to inform taxonomic decisions where morphological methods fail to yield satisfactory resolution.

To date 42 taxa including 39 *Tetratheca*, both *Tremandra* species and one *Platytheca* have been obtained. Sequencing for the plastid *trnL-F* region has been completed for one accession each of 38 of these taxa. Preliminary findings based on the plastid sequence data indicate that:

Tetradthea is monophyletic; Thompson's (1976) notion of a western Australian origin for the group is supported and the eastern species form a clade, albeit poorly supported. As expected *Tetradthea insularis* from Kangaroo Island falls within the eastern clade while *T. halmaturina* falls outside this group.

Sequencing of the nuclear ITS region is currently underway with 26 *Tetradthea*, 1 *Platythea* and 1 *Tremandra* sequenced to date. Preliminary parsimony and maximum likelihood analyses of the ITS data again support a western origin for the group and an eastern clade is evident. Combining the ITS and *trnL-F* data yields the strongest support for these findings.

Acknowledgements

Sincere thanks to the Australian Systematic Botany Society, the Hansjörg Eichler Scientific Fund and the Botanic Gardens Trust for financial assistance to conduct this fieldwork. Thank you to Robyn Barker, Andrea Ramsay and Helen Vonow from the State Herbarium of South Australia for lending us plant presses and showing us around the herbarium. Many thanks also to Phil Pisanu for all his help and advice on Kangaroo Island. And finally a big thank you to Darren Crayn for helping to make the trip both productive and heaps of fun.

References

- Alford, J. J. (1995) Two new species of *Tetradthea* (Tremandraceae), from the Coolgardie and Austin Botanical Districts, Western Australia. *Nuytsia* 10, 143-149.
- Butcher, R., Byrne, M. and Crayn, D. M. (in prep.). New 'leafless' *Tetradthea* Sm. (Elaeocarpaceae, formerly Tremandraceae) taxa from Western Australia: evidence for convergent evolution among phylogenetically distant rare species.
- Butcher, R. and Sage, L.W. (2005) *Tetradthea fordiana* (Elaeocarpaceae) a new species from the Pilbara of Western Australia. *Journal of the Royal Society of Western Australia* 88, 73-76.
- Crayn, D. M., Rossetto, M. and Maynard, D. J. (in press). Molecular phylogeny and dating reveals an Oligo-Miocene radiation of dry-adapted shrubs (Tremandraceae) from rainforest tree progenitors (Elaeocarpaceae) in Australia. *American Journal of Botany*.
- Downing, T. (2005). Phylogenetic Systematics of *Tetradthea* (Tremandraceae) and Related Genera. Masters Thesis, Department of Botany, University of Melbourne.
- Jeanes, J. A. (1996) Notes on *Tetradthea procumbens* Gunn ex Hook.f. (Tremandraceae). *Muelleria* 9, 87-92.
- Savolainen, V., Fay, M. F., Albach, D. C., Backlund, A., van der Bank, M., Cameron, K. M., Johnson, S. A., Lledo, M. D., Pintaud, J. C., Powell, M., Sheahan, M. C., Soltis, D. E., Soltis, P. S., Weston, P., Whitten, W. M., Wurdack, K. J. and Chase, M. W. (2000). Phylogeny of the eudicots: A nearly complete familial analysis based on *rbcL* gene sequences. *Kew Bulletin* 55, 257-309.
- Thompson, J. (1976). A revision of the genus *Tetradthea* (Tremandraceae). *Telopea* 1(3), 139-215.



Figures: 1, Darren Crayn collecting *Tetradthea halmaturina* Kangaroo Island.
2, Phil Pisanu and Darren Crayn sorting specimens Kangaroo Island.
Photos. Hannah McPherson.



Articles

DNA barcoding: good for taxonomy?

Darren Crayn

National Herbarium of New South Wales, Botanic Gardens Trust, Sydney

"DNA barcoding will make a huge difference to our knowledge and understanding of the natural world."

Consortium for the Barcode of Life,
www.barcodinglife.org

"Barcoding is no substitute for taxonomy."

"DNA barcoding ... is counterproductive to furthering our understanding of life."

Ebach and Holdredge 2005 *Nature* 434: 697.

⁹Anybody who is aware of DNA barcoding will know that it is a subject that is dogged by controversy. The statements above exemplify two points of view in a what is currently a highly polarised debate. Supporters of the technology regard it as highly promising, whereas others see it as at best pointless, at worst a serious threat to traditional taxonomy. In this opinion piece on DNA barcoding I will discuss such controversies and try to assess some of the possible impacts of DNA barcoding on plant taxonomy and whether these would be beneficial or not. For context, I provide some brief background on the development of DNA barcoding.

So what is DNA barcoding? DNA barcoding is a tool for identifying biological samples based on short DNA sequences. The name refers to the notion that there exist small homologous regions of DNA found in all life whose sequence is species-specific. Minimally, DNA barcoding requires the construction of a database of reference DNA sequences that are representative of taxa, and are linked to a voucher deposited in a recognised museum or herbarium. Also needed is an efficient and accurate search algorithm to enable a database of millions of sequences to be queried for closest matches, and that can deal with large numbers of queries from environmental sampling projects (e.g. soil/water samples). Initially the database would be populated by a small number of barcodes for each taxon. Most taxa would be represented by a single barcode sequence, whereas some common or important taxa might be represented by many more. But as a growing entity, the sampling of molecular diversity within and among taxa would increase in the database over time. Given this small number of representatives of most taxa, and the fact that current search algorithms are phenetic not cladistic, the method assumes

that variation within taxa is less than between taxa.

The goal would be to have all species represented in the barcode database. Currently, about 1.7 million species have been described, but there is consensus that this is a gross underestimate of the real number, which may be at least an order of magnitude higher. Since the task of compiling a database of sequences of several million taxa is *large*, an ideal barcoding system must be efficient. In order to maximise efficiency, the process of generating the sequence data must be standardised and automated as much as possible. Therefore, it makes sense to use the same DNA region for all groups of life. This region should be variable enough that it can distinguish species in the maximum number and diversity of groups. But it must also be sufficiently conserved that universal primers are possible and alignment of sequences is relatively unproblematic, i.e. there are few insertions and deletions. It should be short so that it can be sequenced in a single run using currently technology, so it must be less than around 600 nucleotides long. And, it should be a region that exists in very high copy number, so that the chances of getting intact copies in degraded samples are maximised.

The mitochondrial CO1 (a.k.a *cox1*) gene, which codes for a subunit of the cytochrome c oxidase protein has been proposed as the region of choice for DNA barcoding because it satisfies most of the criteria outlined above. Studies have shown that this region, which is universal in eukaryotes, can discriminate closely related species in all animal phyla except Cnidaria (jellyfish). Currently over 96000 CO1 barcodes are available, which represent nearly 18000 species. The great majority of these are from animals, ranging from Australian marine fish, to nematode worms and Madagascan ants, and even extinct Moa from New Zealand. On the botanical side, several projects have been undertaken on fungi and red algae. International groups such as the Consortium for the Barcoding of Life (CBOL, <http://barcoding.si.edu>) have been set up to ensure proper standardisation of barcoding and to progress the compilation of the sequence database. GenBank also has a special section to accommodate barcode sequences. Far from being an unproven idea, barcoding is well advanced.

⁹ Adapted from a presentation to the ASBS Brisbane Conference in November 2005.

However, there are significant problems with using the CO1 gene for barcoding land plants. First and foremost is that the region is too conservative in plants to discriminate most species. Secondly, hybridisation and polyploidy are major forces in the evolution of land plants, and mitochondrial and indeed plastid markers are uniparentally inherited so might not be able to distinguish hybrid and autopolyploid species from their progenitors.

So, what should we use for land plants? The phylogeneticists' first great workhorse, the chloroplast-encoded *rbcL* gene, is a possible candidate, owing to the fact that a great many sequences have already been accumulated (at least 17000 of embryophytes in GenBank at time of writing). But is this locus useful? At first glance it appears insufficiently variable, as evidenced by the fact that it frequently fails to resolve phylogeny below the genus level in plants. But autapomorphies (character states which are unique to one taxon in the study group), which are useless for resolving phylogenetic relationships, are useful data for barcoding so regions inappropriate for phylogenetics at species level might work for barcoding (Chase et al., 2005).

John Kress and co-workers set out to test the utility of 11 rapidly evolving DNA regions for barcoding (Kress et al., 2005). In a study of a small flora of 99 species in 53 families, they showed that two regions of non-coding DNA used together have the greatest potential in terms of variability and sequenceability to discriminate the greatest range of taxa. These regions are the internal transcribed spacers of nuclear ribosomal DNA (the so called ITS region), and the spacer region between the genes *trnH* and *psbA* on the chloroplast genome (the *trnH-psbA* spacer).

However, there are still problems with these loci. For example, ITS not universally workable in that there are problems with paralogous (duplicate) copies of the locus in some groups, which can confound all flavours of phylogenetic analysis and therefore identification systems that match unknowns to knowns based on either similarity or synapomorphy. Furthermore, ITS is difficult to amplify and sequence in an frustratingly large minority of taxa, probably due to the very high proportion of guanine and cytosine bases conferring stable secondary structure in vitro. And, the *trnH-psbA* spacer, like many non-coding regions shows a great deal of length variation among land plants which can confound alignment and therefore the search algorithms.

To develop a better, more universal barcode for plants, the Plant Working Group was established within CBOL. This group of eleven

organisations from North and South America, South Africa, and the UK has shortlisted five plastid coding loci: *matK*, *rpoC*, *rpoB*, *accD*, *YCF5*. These loci are currently being tested on a diverse group of land plants including species sister pairs from all major lineages. The recommended amplification and sequencing protocols and primers are available on the CBOL website. These loci currently hold the greatest promise for barcoding land plants.

So that is a brief history of DNA barcoding. What about the controversies. On the negative side, some criticisms that have been levelled at the approach include:

- It will divert funding from taxonomy ...
This seems to be a commonly held suspicion, but to my knowledge there is no good evidence for this. Existing funding sources for taxonomy, such as the Australian Biological Resources Study or the Program for Enhancing Expertise in Taxonomy (PEET) of the National Science Foundation (USA), do not fund barcoding. Rather, barcoding projects have succeeded in attracting money that might not otherwise be available for taxonomy. For example, the consortium for the barcoding of life is primarily funded by the Alfred Sloan Foundation, a private body. Furthermore, if barcoding projects incorporate basic morphology-based taxonomic components, as would be highly desirable, then traditional taxonomy might find itself better funded than ever.
- Not being research, it will turn taxonomy into 'service industry' ...
True, barcoding is not hypothesis-driven research, nor a substitute for critical taxonomic analysis and research, but rather an additional identification tool that will enable identification of a much broader range of material than is currently possible with morphology based approaches. I believe that most proponents of barcoding would hold this view. And for the service industry jibe – taxonomists have always spent part of their time, sometimes the major part, in a service role, such as identifying material from survey work. Barcoding has the potential to lighten this burden greatly in delivering to non-taxonomists unprecedented power to accurately identify organisms.
- DNA barcoding simply won't work ...
Various reasons put forward include the notions that a partial database is useless and a complete database of all taxa is a pie in the sky. However, partial databases are useful for exclusion of groups from the range of possible identities for an unknown. Is an incomplete herbarium useless? Is an

incomplete Flora useless? I would argue no. For studies that exemplify the potential of barcoding and demonstrate its efficacy in a wide range of groups, see the barcoding theme issue of *Philosophical Transactions of the Royal Society* (2005: vol. 360). Of particular interest is the introductory paper (Savolainen et al., 2005) which provides an excellent comprehensive overview of DNA barcoding.

- Can one or a few DNA fragments really discriminate all species?

This is a valid question, and there are clear concerns. CO1, the region of choice for animals, fungi and algae, has some problems – nuclear pseudogenes have been identified in primates, although reverse transcription PCR workarounds for this problem have been developed. For plants CO1 is too conservative, as I have already discussed. ITS and the *trnH-psbA* spacer show promise in plants, as do the loci recommended by the results of the recent survey undertaken by the Plant Working Group of CBOL but no doubt there will be groups for which these regions don't work.

It is important to recognise that by far the most difficult and time consuming step in compiling a DNA barcode database is collecting, identifying and vouchering the raw material. Extracting the DNA and sequencing the target barcode regions is increasingly routine and inexpensive with the development of lab robotics and high-throughput sequencing technology. Already technology has been developed that can sequence entire bacterial genomes of 25 million bases at >99% accuracy in four hours (Margulies et al., 2005). Within a few years such technology is likely to reduce the cost of sequencing to the point that it will be a trivial component of the barcoding endeavour. So, once the DNA is archived, it should become a routine and inexpensive matter within a short time to then generate barcode data from additional loci for problematic groups.

So those are some of the criticisms that have been levelled at DNA barcoding. On the other hand, proponents would argue that DNA barcoding:

- can free taxonomists from routine identification work.

Currently many taxonomists are overburdened with identifying the flood of specimens that are generated from survey work. I think all taxonomists, and therefore taxonomy, could certainly benefit from less resources spent on routine identification. A very useful capability of DNA barcoding is in enabling the identification of 'difficult' material, such as sterile specimens, different life history stages or juveniles in the case of plants, fragmentary specimens such as

forensic samples and "ecoscraps" etc. These types of material are in many cases unidentifiable with current knowledge and existing collections, and possibly such material could never be identified even with vastly improved collections and knowledge of morphology.

- facilitate rapid biodiversity inventories.

According to some technical experts a handheld barcoding device is technically feasible now, and it is likely one will be available within five years. With such a device, and the barcode database, biodiversity inventories could be compiled much easier and more accurately than before. The conservation implications are obvious.

- could help rapidly advance systematics by building capacity and encouraging technical innovation.

Many molecularly-oriented systematists and other evolutionary biologists have long dreamed of access to the sorts of collections that herbaria provide for morphologists, ecologists etc. Comprehensive, properly designed and curated DNA banks would greatly facilitate molecular studies by eliminating the greatest financial and practical limitation – obtaining suitable material.

Finally, a quick summary of where some of the challenges lie in developing DNA barcoding for plants. Firstly, the problem of DNA quality is paramount for some groups of plants. Different groups may require different DNA extraction protocols, which would affect the efficiency and automation of the process. Secondly, selecting the appropriate regions to sequence is critical to success. As discussed, the CO1 gene, the choice for animals, is not useful for plants. So, current research is focused on which region or combination of regions is best. Critical to success of any region is how well it can distinguish taxa of hybrid or polyploid origin. Lastly, there are challenges in developing the computer algorithms for matching sequence from unknowns to those in the database. Using a phenetic approach is simplest and quickest, but may lead to mismatches for closely related taxa. A cladistic procedure is probably best, but this might require building trees of tens of thousands of taxa, well beyond the capability of current technology.

In conclusion, I offer the following opinion: DNA barcoding is an identification tool and **not** a substitute for taxonomy, but should be tied to it. It doesn't necessarily compete with traditional taxonomy for funding, rather it can access funding not normally available to taxonomy. The materials (DNA bank, collections) and data (sequences) generated by the barcoding

endeavour can help to rapidly advance systematics. Therefore my view is that barcoding can be a boon for taxonomy.

For further detail on the application of the technology I direct the reader to the special issue of *Philosophical Transactions of the Royal Society* that contains 18 papers from the First International Barcode Conference. It is a good entry point to the barcoding literature and is available electronically without charge at Web ref. 1.

These websites are also useful (Web refs. 2,3).

References

- Chase, M. W., N. Salamin, M. Wilkinson, J. M. Dunwell, R. P. Kesanakurthi, N. Haidar, and V. Savolainen. 2005. Land plants and DNA barcodes: short-term and long-term goals. *Philos. Trans. Roy. Soc. B.* 360.
- Kress, W. J., K. J. Wurdack, E. A. Zimmer, L. A. Weigt, and D. H. Janzen. 2005. Use of DNA barcodes to identify flowering plants. *Proc. Natl. Acad. Sci. USA* 102:8369–8374.
- Margulies, M., M. Egholm, W. E. Altman, S. Attiya, J. S. Bader, L. A. Bembien, J. Berka, M. S. Braverman, Y.-J.

- Chen, Z., Chen, S. B. Dewell, L. Du, J. M. Fierro, X. V. Gomes, B. C. Godwin, W. He, S. Helgesen, C. H. Ho, G. P. Irzyk, S. C. Jando, M. L. I. Alenquer, T. P. Jarvie, K. B. Jirage, J.-B. Kim, J. R. Knight, J. R. Lanza, J. H. Leamon, S. M. Lefkowitz, M. Lei, J. Li, K. L. Lohman, H. Lu, V. B. Makhijani, K. E. McDade, M. P. McKenna, E. W. Myers, E. Nickerson, J. R. Nobile, R. Plant, B. P. Puc, M. T. Ronan, G. T. Roth, G. J. Sarkis, J. F. Simons, J. W. Simpson, M. Srinivasan, K. R. Tartaro, A. Tomasz, K. A. Vogt, G. A. Volkmer, S. H. Wang, Y. Wang, M. P. Weiner, P. Yu, R. F. Begley, and J. M. Rothberg. 2005. Genome sequencing in microfabricated high-density picolitre reactors. *Nature* 437:376–380.
- Savolainen, V., R. S. Cowan, A. P. Vogler, G. K. Roderick, and R. Lane. 2005. Towards writing the encyclopaedia of life: an introduction to DNA barcoding. *Philos. Trans. Roy. Soc. B.* 360:1–7.

Web references

- Web ref. 1. [www.journals.royalsoc.ac.uk/\(glrwgbnouilwjgqepzjb45\)/app/home/issue.asp?referrer=parent&backto=journal,7,120;linkingpublicationresults,1:102022,1](http://www.journals.royalsoc.ac.uk/(glrwgbnouilwjgqepzjb45)/app/home/issue.asp?referrer=parent&backto=journal,7,120;linkingpublicationresults,1:102022,1)
- Web ref. 2. http://barcoding.si.edu/index_detail.htm
- Web ref. 3. www.barcodinglife.org/

Flora Tasmanica exhibition opening address

Gintaras Kantvilas
Tasmanian Herbarium

¹⁰Some 400 years ago, after Botany had emerged out of the clutches of apothecaries and herbalists, and begun its long and tortuous strides towards modernity, it was a fashionable affair. Science and knowledge as *passtimes* were limited in those days very much to those with time on their hands and gold in their pockets, and many of the key steps in the advancement of Botany were more often than not lavish affairs, combining sumptuous expressions of fine art, dramatic feats of exploration and, of course, good scholarship. One only needs to recall highpoints such as some of the grand botanical publications of the Renaissance, or Hans Sloane's magnificent combination of dried plant specimens and botanical illustrations in his account of his exploration of Jamaica, or, as far as our part of the world is concerned, Sir Joseph Banks' *Florilegeum*—his amazing and beautiful publication of the first discoveries of Australian botanical curiosities such as *Banksia*.

Somewhere along the way, however, things changed and, as a professional botanist, dare I say for the worse. We botanists are no longer the toasts of the Royal Court (or its modern equivalents), and rarely are our whims and curiosities funded by the largesse of the wealthy

elite. When Robert Brown published his *Prodrromus*, his account of the Australian and Tasmanian floras, in 1810, he was devastated that it was unenthusiastically received and sold poorly. Here was one of the most scholarly botanical works of all time, relevant not only to Australian Botany but to plant classification in general, yet it was a publishing failure. Was this really because it had no pictures and was written in Latin?

Since then, it has been something of a downhill slide for Botany in the community. It is frequently perceived as the domain of stuffy, odd boffins in tweed jackets; most bookshops seem to have difficulty shelving botanical books, placing them somewhere between 'gardening' and 'pets'; and most teenagers I know are either unsure of what it is, think it's boring, or feel they did it all last term. So the onus is squarely on us, the botanical community, to educate and excite the public, and to gain the patronage of those who can fund our pursuits. We can, and do, undertake this through scholarship. However, people also often need to be reminded that not only are plants essential for life itself, and to the Carbon cycle, or that we need them for food, medicines and other natural products, or that they are integral to the conservation of biodiversity, but that they are also beautiful, and that that

¹⁰ Presented to the opening of the exhibition in Canberra on April 5th, 2006. See p. 42

beauty alone is worth striving for, exploring, conserving and proliferating.

In that regard, this exhibition will, I hope, make a strong contribution, by exciting and inspiring, and opening the eyes of the visitor to what wonders reside on our doorstep within the plant kingdom.

When I was growing up in Tasmania in the late 1950s and 1960s, the Tasmanian wilderness was certainly an unknown and remote place; the south west was referred to as 'the empty quarter'. However, many Tasmanians had some idea of what was there. The Tasmanian Hydro Electric Commission was the State's largest employer and was busy building roads, dams and power stations in the wilderness, and virtually every Tasmanian had a friend or relative 'at the Hydro' who could relate stories of the rain, the scrub and the mountains that lay beyond the fringe of civilisation. I was no exception, and had an uncle at the Hydro, but he was a rather unusual man, being an explorer, bushwalker and photographer; the occasional family slide-show brought that remote and awe-inspiring wilderness into our living room. That uncle was Olegas Truchanas, and his photos were to bring about a revolution in Tasmania- in what Tasmanians knew about the wilderness on their doorstep, the value they placed on it, even to the point of stirring political activism, and the way they portrayed it through the genre of wilderness photography.

On occasional visits to my uncle's house, when he was sorting gear or disassembling his custom-made kayaks, I remember another, younger man, watching intently and helping here and there. This was Peter Dombrovskis, Olegas's protege, who would ultimately take wilderness photography as an art form to heights previously unimagined.

It is ironic that these first, magnificent interpretations of the Tasmanian wilderness landscape were undertaken by immigrants from the Baltic States, in Truchanas' case, Lithuania; in Dombrovskis', Latvia. For in many ways, it is difficult to imagine more different geographical and cultural provenances than Tasmania and the Baltic. Latvia and Lithuania are incredibly flat, their highest points rising only a few metres above sea-level; bedrock lies under many metres of fine soil deposited by the glaciers. Their forests have evolved over the millennia hand-in-hand with human occupation, for people and plants colonised this landscape together in the wake of the retreating ice. Baltic human history incorporates strong druidic and pantheistic traditions involving worship of ancient trees and the ritual of the hunt, for these people were Europe's last pagans, succumbing to Christian baptism only in the late 14th Century. Contrast this with Tasmania, ruggedly mountainous,

rocky and wild, sparsely populated, and as far as its European history goes, firmly dominated by axe, pick and plough. It is indeed ironic that much of the awakening of Tasmanians to their natural world was led by two Baltic migrants.

When Olegas Truchanas died in 1972, a committee of his friends including Peter Dombrovskis worked to publish a book displaying a selection of his photographs. Previously the only vehicle for promoting these images had been through public lectures and slide shows. The challenge to faithfully reproduce the images was challenging in those days of relatively primitive and grossly expensive colour printing, but the final outcome, *The World of Olegas Truchanas*, was a huge success, running to several impressions and effectively catapulting images of Tasmanian wilderness onto the coffee tables of the world. It also paved the way for Dombrovskis himself, and as technology improved and demand grew, Peter's photographs began to appear everywhere: in calendars, books, diaries, cards. His famous image of Rock Island Bend was the icon of the anti-dams campaign in Tasmania in the 1980s, and today it is commonplace to see his photographs everywhere: we have them at home, in our offices, and we send them to our friends and colleagues overseas as gifts, and as an insight into the beauty of the place where we live. Furthermore, his work has spawned a whole movement of wilderness photographers, not only in Tasmania but elsewhere.

The ease with which we ourselves acquire photographs these days- after all, it can be simply a case of driving out into the bush and pointing the camera at something- belies the depth of Peter's photographs, for these are not idle snaps from the comfort zone: rather they are the product of often-intensely gruelling expeditions, requiring physical strength, mental toughness, endurance and tremendous patience, and it is out of the effort that the artist expends that comes the intimacy with the subject, and an understanding of its moods. They are timeless scenes that invite us to immerse ourselves into a world that seems purer, simpler and more dramatic than the one we live in daily. The words of the English landscape painter Constable, whose works are on display at the National Gallery at the moment, seem particularly relevant: "we see nothing until we truly understand it". Dombrovskis captures his personal interpretation of the totality of the scene, and leaves us to find the details for ourselves. The titles on the works here are simply plant names, but the images capture far, far more.

The display of Lauren Black's paintings here forms a powerful contrast to Dombrovskis' work as a medium for presenting images of our flora.

For unlike Dombrovskis, Lauren unteases and depicts the botanical character of each individual species. Art has been the indispensable and inseparable companion of Botany for centuries. Pictorial representation of the diagnostic features of plants predates the very development of the precise language and technical terminology used to describe them. It is the means for recording and demonstrating the subtle features that make each plant species unique. As the old saying goes 'a picture says a thousand words'. Botanist and artist have worked hand in hand to reveal the diversity of the world's flora. In our part of the world, behind, or perhaps next to, the botanist Sir Joseph Banks stands the artist Sydney Parkinson; with Robert Brown is linked Ferdinand Bauer, still regarded as the greatest botanical artist of all time; and in much more recent times in Tasmania, we have had the partnership of Winifred Curtis and Margaret Stones.

Since her arrival in Tasmania in 1999, Lauren has established herself as a leading and much sought-after botanical artist. Her work has featured in many exhibitions, often combined with herbarium specimens and other objects within historical, cultural or scientific contexts. Like Dombrovskis's photographs, Laurens' paintings and drawings are born of patience, observation and a total immersion in the mood and subtlety of her subject. It is so refreshingly reassuring that in this age of impatience and ease, of take-away digital photography that can seemingly achieve anything, that the centuries-old tradition of botanical illustration is flourishing, for no amount of 'point and click' can ever compete with what the careful, trained eye can see, and the skilful, steady and patient hand can depict.

Lastly I must turn to the porcelain of Les Blakebrough, regarded as one Australia's greatest ceramic artists. Depicting flora and other botanical themes on porcelain is also a very old

tradition. In the late 18th century, for example, the Danish botanist, George Christian Oeder, initiated a project to depict the plants of Denmark in a series of folio-sized botanical illustrations, *Flora Danica*. The aim of the project was to popularise Botany and so enhance general knowledge of Denmark's plants. To that end, the work, which ultimately comprised 51 parts, 3 supplements and 3240 copper engraved plates, appeared as a cheap, plain edition that was widely distributed, and a lavish hand-painted edition. The images were also transferred to porcelain, more than 1800 pieces in all, to serve as Royal gifts and for use by the Danish Royal family. Through all this, Oeder served as Professor of Botany by Royal decree, the self-governing Royal Botanical Institution was established, and the whole project was supported financially by the Crown. Those were the days!

Les Blakebrough's *Flora Tasmanica* emulates in a rather more modest way Oeder's grand *Flora Danica*, depicting six of Lauren's images of Tasmanian endemic plants onto plates of the finest porcelain. The plants include *Lomatia tasmanica*, or Kings Holly, a species represented by just one genetic individual which, at more than 43 000 years old, must potentially be the oldest living organism on the Earth. It is so fitting that more than 300 years later, one suite of the collection on display here was presented to Crown Prince Fredrick of Denmark and Tasmanian-born Crown Princess Mary Donaldson as a wedding gift.

Thus we have come full circle, for Blakebrough's work has effectively delivered Botany back to the royal courts of Europe from where it once received so much of its patronage and impetus all those years ago.

I now invite you all to explore and immerse yourselves in the images on display here by declaring this exhibition open.

Miscellanea

Change of standard form of name

Jürgen Kellermann
National Herbarium of Victoria, Royal
Botanic Gardens Melbourne

Due to a mistake by IPNI, I was assigned the wrong standard form for my name. This has recently (Feb. 2006) been rectified and changed from 'J.Kellerm.' to 'Kellermann'. Please note, that three taxa were published with the wrong abbreviation, namely:

- *Ochetophila nana* (Clos) Kellermann, Medan & Agesen, *New Zealand Journal of Botany* 43(4): 867 (2005).
- *Spyridium daltonii* (F.Muell.) Kellermann, *Muelleria* 22: 97 (2006).
- *Spyridium xramosissimum* (Audas) Kellermann, *Muelleria* 22: 98 (2006).

Thanks to David Cameron (DSE, Victoria) for finding the error.

Collecting Charophytes.

Michelle Casanova

amcnova@netconnect.com.au

Australian herbaria have relatively few charophyte specimens, many of which are either poor specimens (infertile or immature) or poorly preserved (great wads of green stuff, all stuck together). In a recent historical study in Switzerland Joye et al. (2002) accessed 3100 specimens (in that small country, with 27 taxa). They called species 'rare' if there were fewer than 100 specimens (Joye et al., 2002)! In Australia we'd be lucky to have 800 specimens in all our herbaria (and in excess of 60 species here) and many species are represented by a single gathering collected over a hundred years ago.

When you find them, try to rinse off any debris by gently shaking them under water. If possible, obtain several specimens from the one site as they are often dioecious (separate male and female plants) so a single plant may be insufficient for identification. Try to collect specimens with reproductive structures on them (tiny orange or yellow or green or black "berries" on the "leaves") as these are *extremely* useful for determination. Put them in a plastic bag with a little water and note field characteristics including depth of water, substrate, salinity and pH if you have facilities for these, (a taste test for salinity is better than nothing), whether the water is flowing or not and how fast, the height of the plants and whether the site is permanent or temporary, site location in relation to major land marks or roads (latitude and longitude if you have it) and any other useful details (e.g. if the site is shaded, or sunny, the other vegetation present, the comparative abundance of the charophyte, presence of fish or invertebrate grazers etc.).

When you get back to the lab or dry land, the easiest thing is to label a piece of paper the right size with some of the details (e.g. location, date, your name and your collection number) then float the charophyte onto the paper if it is very fine and delicate with spreading branches, or just place it on the paper if it is robust and you can arrange it neatly. It is useful to spread the charophyte out on the page because it makes the details of the branches and stems easier to see than if they're all stuck in a lump. Place the wet sheet on newspaper, cover with some waxed paper (so it doesn't stick to the newspaper) then cover with newspaper and press as you would ordinary plant specimens. You will need to change the paper a bit more frequently to get it dry and prevent mould.

If you have the gear wet specimens are also extremely useful, 70% alcohol is probably safest, several stems in a wide-mouthed specimen bottle with the pencil written label inside (name, date, location and specimen number). In practice charophytes carry quite a lot of water with them, so I usually put a few stems in a bottle then top it up with straight metho. That works well enough to preserve chromosomes for counting sometimes.

Deposit your specimens in an Australian herbarium and your name will be recorded forever as a charophyte collector (as most of our illustrious predecessors were). Better yet, the specimens are likely to be used to improve our knowledge of the systematics of the Characeae. The day will come when these diverse and abundant algae are well-known and used as a tool in water management. If you have any problems or questions regarding charophyte collecting, feel free to contact me by email.

Reference

Joye, D.A., Castella, E. and Lachavanne, J.-B. (2002) Occurrence of Characeae in Switzerland over the last two centuries (1800-2000). *Aquatic Botany*, 72: 369-385.

Ongoing *Lavandula* research in Australia

Susyn Andrews

86 Thompson Ave, Kew
Richmond, Surrey TW9 4JN

Following on from the publication of *The Genus Lavandula* by Tim Upson and myself in May 2004, I was invited to give two keynote talks to the New Zealand Lavender Growers' Association Conference at Te Awamutu in late August 2005. As it would be midwinter there and few lavenders would be in flower, I decided to follow up on my ongoing research into the history of lavender in Australasia (pp. 42-49, Upson & Andrews (2004)).

I flew into Auckland on 23rd August and presented *Lavender growing in the Northern Hemisphere – from a commercial and cottage industry perspective*, which was a joint paper with Simon Charlesworth and *Misconceptions and problems in cultivated Lavandula classification*. I also participated in an open forum and co-led a discussion on various issues with Virginia McNaughton, author of *Lavenders the grower's guide* (2000).

Following on from the conference and my researches in New Zealand, I flew into Sydney on 4th September and worked at 'NSW' for a couple of days looking through their historic material of *Lavandula*, as well as in the library. I

had last been there in January 2002 and it was extremely useful to have a post-publication view. I also gave a watered-down version of my first NZ presentation to the staff.

My next stop was Melbourne and I stayed with a colleague Roger Spencer, the horticultural taxonomist at 'MEL'. Some time was spent in the herbarium re-examining their historic lavender specimens and some more modern interesting introductions, as well as the library. The few days I spent at the Yuulong Lavender Estate near Mt. Egerton gave me a breathing space to put all my notes and photocopies in order and to catch up on the latest lavender gossip. I also gave a short talk to a tour group of senior citizens from Melbourne.

My final stopover was Adelaide, a city I had not visited before. At 'AD' I went through all their *Lavandula* material but I ran out of time in their wonderful library and will have to return. It was a horticultural treasure-trove of books and nursery catalogues. I also went through all the living accessions of *Lavandula* with John Sandham, their Collections Development Officer and a former Kew student, including their

intriguing bed of *L. buchii*, *L. canariensis* and their hybrids (pp. 307, 347, Upson & Andrews (2004)).

I was also able to telephone Dr Brian Morley, my former lecturer at the National Botanic Gardens, Glasnevin, Dublin in the early 1970s and the recently retired Director of the Adelaide Botanic Garden.

I finally flew back to London on 18th September, laden with books, papers, notes, lavender artifacts, etc. and a whole host of memories of people and places from yet another wonderful visit to New Zealand and Australia.

A view of herbaria and botanic gardens in *Nature*

The topic "Herbaria and Botanic Gardens – their increasing relevance as holders of biodiversity" was discussed in the 13 April 2006 issue of *Nature* (vol. 440: 860-863) or if you have access to it online at www.nature.com/nature/journal/v440/n7086/full/440860a.html

News

Australia Day Honours for services to *Eucalyptus*

Congratulations to Ian Brooker, now a Member of the Order of Australia (AM) and Kevin Rule, who received the Medal of the Order of Australia (OAM) in the Australia Day honours list. Ian's citation was for service to botany, particularly through research leading to the identification and classification in the genus *Eucalyptus*, and as an author; Kevin's was for service to botany, particularly in the field of eucalyptus taxonomy. Ian's work and life-long devotion to *Eucalyptus* is well known to all members of the society through his books and Euclid keys covering the whole of Australia. Kevin's work has primarily been based in the south-east of Australia where he has described about 20 new taxa in *Eucalyptus* since 1992.

An *Atlas of Living Australia*

The proposal to develop an *Atlas of Living Australia* (a "Biodiversity Google") by 2015, based on a real time identification and web-based taxonomy system, and incorporating Australian engagement in the International Barcode of Life Program and linked to a National Network of

Collections was an outcome of the Prime Minister's Science, Engineering and Innovation Council (PMSEIC) Working Group on Biodiscovery; this group was chaired by Snow Barlow and Judy West and Kingsley Dixon were members of the group.

Judy reports that the *Atlas of Living Australia* concept has caught the imagination of government and is the basis of a proposal being put forward for 07/08 financial year.

You can see the report and the presentation to the Prime Minister and the Council at Web ref. 1.

There is also support for the concept in FASTS submission to Treasury Budget 2006/7 where they recommend the Government commit an additional \$5m per annum for the next decade to provide for an *Atlas of Living Australia* as recommended in the PMSEIC working group paper (Web ref. 2).

Web references

Web ref. 1. www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/biodiscovery.htm

Web ref. 2. www.fasts.org/Fsite/News/submissions/Treasury_sub_06-07.doc

CHAH business

Australian Plant Census

Work on the 'first pass' of the APC is approaching its midpoint (completion scheduled for the end of April 2007). The compilation and checking of synonymic lists is proceeding smoothly and more or less on schedule. An active team has been recruited to enter the final data into APNI, and has fallen into a productive routine.

Additional families treated

Groups compiled for the Census since the last newsletter are listed in Table 1. All or most will be available as pdf files on the APC website (Web ref. 1) by the time this newsletter is distributed. To access them go to the bottom of the home page and click on <List of families>. All will be added to the APC database over the next month or so, with hyperlinks to the bibliographic view of APNI.

Plans for integration of *Flora of Australia* and APC

Already the first benefits of the APC project are being realised. Helen Thompson at ABRIS has been using our compilations 'hot off the press' to update and annotate the nomenclature displayed in the ABRIS *Flora On-Line* project. In fact this is generating benefits in both directions. To my intense chagrin, she is still finding (mainly minor) problems in the APC synonymies, and we are working together to eliminate these in both projects. I should also mention that the APC data-entry team of Kirsten Cowley, Anna Monro, Bronwyn Collins and Brendan Lepschi also bring to my attention occasional problems with the

lists that have already passed the Working Group and CHAH filters. Thus the CHAH Census (APC) represents the considered opinion and nomenclatural research efforts of me, 16 members of the APC Working Group, researchers that the Working Group consult in each herbarium, 8 Heads of herbaria, 4 APC data entry people and user groups such as ABRIS. This should ensure that what finally appears on the Web is as squeaky clean as we can manage it.

Those of you who read the above list of families in detail will note that it includes all the families slated to appear in *Flora of Australia* vol. 2. This is a new departure. Until now we have been working through the published volumes of the *Flora*, updating the nomenclature and adding taxa published since the *Flora* volumes came out. This task is just about complete. Apart from volumes 49 & 50 (the islands and territories), the only ones left to treat in this way are 19 (*Eucalyptus sens. lat.*), 46 (Iridaceae to Dioscoraceae) and 48 (ferns and gymnosperms). After discussions with ABRIS it has been decided that the next priority will be to work through *Flora of Australia* volumes and part volumes that are nearing completion, and subject the proposed nomenclature to the APC vetting process. This should have two major benefits. It should throw up omissions and commissions in the *Flora* manuscripts that can be discussed with authors (and if necessary amended) before the volumes go to press. Secondly, it will ensure that the *Flora* and APC proceed together in lock step (or as near as we can get it). Annette Wilson and I

Table 1. New families (since *Austral. Syst. Bot. Soc. Nsltr* 125)

Aceraceae	Burseraceae	Haemodoraceae	Monimiaceae	Santalaceae
Akaniaceae	Cabombaceae	Hernandiaceae	Musaceae	Sapindaceae
Alangiaceae	Cannaceae	Himantandraceae	Myristicaceae	Simaroubaceae
Anacardiaceae	Cardiopteridaceae	Hippocrateaceae	Nelumbonaceae	Solanaceae
Annonaceae	Celastraceae	Hydatellaceae	Nymphaeaceae	Sparganiaceae
Apocynaceae	Ceratophyllaceae	Iacacinaceae	Olacaceae	Stackhousiaceae
Aquifoliaceae	Cornaceae	Idiospermaceae	Opiliaceae	Trimeniaceae
Aristolochiaceae	Corynocarpaceae	Lauraceae	Papaveraceae	Typhaceae
Asclepiadaceae	Costaceae	Liliaceae sens. lat.	Philydraceae	Viscaceae
Austrobaileyaceae	Dichapetalaceae	Loganiaceae	Piperaceae	Winteraceae
Balanophoraceae	Eupomatiaceae	Loranthaceae	Pontederiaceae	Zingiberaceae
Berberidaceae	Fumariaceae	Melanthaceae	Rafflesiaceae	
Bromeliaceae	Gentianaceae	Menispermaceae	Ranunculaceae	
Brunoniaceae	Goodeniaceae	Mimosaceae - <i>Acacia</i>	Rhizophoraceae	

will be working together closely on this part of the project, and authors of manuscripts 'in press' or 'submitted' to the *Flora of Australia* may hear from either (or both) of us, pursuing different but complementary agendas.

APC trivia for the statistically minded

In the 8 months since the beginning of August 2005, when we began compilation of the family-by-family synonymies, we have treated about 25,000 names. These make up accounts of about 114 families, 814 genera and 7150 accepted species names. The 'about' is because some groups are still under consideration by the Working Group. For example, at present we are treating Liliaceae in a very broad sense, but if all the segregate families of 'Liliaceae' were to be recognised, the number of families treated jumps to 132!

Some of the synonymies provide interesting figures. *Acacia paradoxa* still easily holds the record for most synonyms – 46. Joint runners-up at this stage are *Banksia marginata* and *Lomatia silaifolia* with 22 synonyms each, closely followed by *Passiflora aurantia* and *Ficus microcarpa* with 19 each. Among the genera, *Anigozanthos* is a stand out, with 15 synonyms, most orthographic variants on its correct spelling. On the other hand, two families, Hamamelidaceae and Resedaceae, are distinguished for having no synonyms (we obviously didn't try hard enough).

Food for thought

One of the decisions that was made very early on in this project was that we would try to account for as many as possible of the informal names that have been applied to the Australian flora, particularly those of the last 25 years. This has been fairly successful in my view, and for the first time in many cases, these names have been securely attached to formal published names, and one source of confusion and ambiguity for land managers and others has been reduced.

However, what has come as a considerable surprise to me has been the large number of informal phrase names that are still in use, and for which no formal (Latin) name is available. I

am well aware that in many jurisdictions there is a need to coin informal names quickly for herbarium management, conservation legislation and similar matters, and this is perfectly understandable. However, in many cases these 'temporary' names are still in use 10 or 15 years later. I have not done an accurate count, but my gut feeling is that across all groups there might be as many as 1 informal phrase name in use for every 20-30 formal names. The distribution is very patchy.

The numbers can be interpreted in a number of ways. What follows is my personal view. On one hand, they could indicate that taxonomy is alive and well, and exploration activity is booming, running well ahead of the (formal) descriptive effort, and active researchers are trying to address the taxonomic impediment by making their thoughts available as 'works in progress'. This is probably true in some cases. Sadly, I suspect that the long life of many of these informal names indicates that just the opposite is true. Alpha (descriptive) taxonomy is in a parlous state. New discoveries or suspected new taxa are being noted, but there are few left to carry out the detailed investigations and provide formal descriptions. Informal names are easy to coin, and are increasingly being seen by user groups as being equal to and interchangeable with formal (Latin) names. Phrase names and manuscript names are increasingly used in coffee table type books, whether out of ignorance or frustration. What should we do about it? Sadly, I have no magic solution. I hope that the APC will, when the first pass is completed in a little over 12 months, provide some solid statistics that can be used to argue a case for a revival of alpha taxonomy and nomenclature in Australia. Without it I fear that formal descriptive taxonomy will dwindle and die, and formal nomenclature will increasingly be seen as optional. That would be a sad epitaph for over 200 years of effort.

Tony Orchard
APC Coordinator

Web reference

Web ref. 1. www.chah.gov.au/chah/apc/index.html

ABRS report

Advisory Committee Meeting

The ABRS Advisory Committee met 28–30 March. We were pleased to welcome new members:

- Prof Chris Austin, Head of Science and Primary Industries School, Charles Darwin University, NT.

- Dr Marco Duretto, Tasmanian Herbarium, Tasmanian Museum and Art Gallery, Tas.
- Emeritus Prof Jack Elix, Department of Chemistry, Australian National University, ACT.
- Associate Prof Jenny Davis School of Environmental Science, Murdoch University, WA.

The main order of business was assessing the grant applications for 2006–7. The Committee also approved the award of student bursaries. Grant recommendations are sent to the Minister for consideration and approval and applicants can expect to be notified after the May budget.

Staff news

Chris Moon has joined ABRS as an assistant editor until 30 June 2006.

ABLO

I am pleased to announce that the next ABLO, for 2006–2007, will be Mrs Jenny Tonkin, a research associate at the Royal Botanic Gardens Melbourne, who is completing a PhD on Systematic studies in the Australian agaricoid genera *Rusula* and *Lactarius*.

Nominations for the next ABLO (2007–2008) have been called and details are available on the ABRS website. The closing date is 31 August 2006.

Student Travel Bursaries

ABRS is receiving some very worthy applications from postgraduate students seeking assistance to attend national and international conferences. Successful applicants for the current round of Student Bursaries will be advised shortly. The closing date for the next round of Student Bursaries is 10 September 2006.

Flora of Australia

Contributors to the *Flora of Australia* are reminded that we have supplies of determinavit slips and “Seen for Flora of Australia” stickers for use on herbarium sheets. Contact Annette Wilson (annette.wilson@deh.gov.au) if you would like some. We can also supply blank *Flora of Australia* maps if you prefer to produce maps manually rather than provide lat/long data electronically.

Forthcoming publications

We expect to send the following volumes to press in the next couple of months:

- *Flora of Australia* volume 2 - Magnoliales to Papaverales
- *Flora of Australia* volume 51 - Mosses.
- *Algae of Australia*: Introduction
- *Fungi of Australia*: *Septoria*

Other publications currently being worked on include:

- *Flora of Australia*
 - *Flora of Australia* volume 26: Meliaceae, Rutaceae, Zygophyllaceae
 - *Flora of Australia* volume 39: 16 monocot families
 - *Flora of Australia* volume 44A:
 - *Flora of Australia* volume 44C:
- *Algae of Australia*
 - *Algae of Australia*: Nemaliales

- *Algae of Australia: The Green and Brown Macroalgae of Lord Howe Island and the Southern Great Barrier Reef*
- *ABRS Identification Series*
 - *FunKey (Macrofungi of Australia): Key to Agarics* (Lucid CD)
- Other publications
 - *On the Fly*
A Lucid interactive electronic key to all fly families found in Australia. Illustrated with hundreds of photographs, as well as line drawings to illustrate anatomical structures. The project was managed through CSIRO Entomology (ANIC) by David Yeates. Publication is expected to be in May and the key will be available from the Centre for Biological Information Technology (www.cbit.uq.edu.au) for about \$67.
 - *Castiarina - Australia's Richest Jewel Beetle Genus*
Written by Shelley Barker, of the South Australian Museum, with superb colour illustrations of all 478 beetles prepared over 30 years by 4 artists. This book is at press, with expected publication in late March. Available directly from ABRS for \$90.

Mary Colreavy
ABRS Director

After receipt of this report we received the following news from Mary Colreavy and Helen Thompson.

Mary Colreavy has moved on to the position of Assistant Secretary with the Programmes Division of the Australian Government Natural Resource Management, effective from Monday 3 April. This is a joint venture between the Department of the Environment and Heritage and the Department of Agriculture, Fisheries and Forestry¹¹.

Helen Thompson is Acting Director, ABRS until further notice. It is intended to advertise and appoint a new Director as soon as possible. In the meantime, Helen can be contacted on (02)6250 9445 or helen.thompson@deh.gov.au

Jim Croft is taking on the role of Australia's Nodes representative at GBIF, which will help provide some continuity in this important programme area.

We are sure that all members will wish Mary well in her new position and we thank her for her willingness to communicate ABRS activities through the newsletter.

Eds.

¹¹ Mary's email address remains the same.

ABLO report

Spring is late to arrive this year, and I am impatiently waiting for the garden's bulbs to reveal their full splendour. I type this report to the sound of sleet pelting against my office window, and as I peer out across Kew Green, an all too familiar blanket of grey is creating a very bleak scene indeed. I don't doubt that this miserable English winter is responsible for the lack of Australian visitors to Kew this quarter.

ABLO enquiries have continued to arrive steadily from across Australia, New Zealand and the United Kingdom. I have received just over 100 requests since commencing my year at Kew. One of the most delightful aspects of this job has been meeting and/or corresponding with so many colleagues. This posting has also provided some unique social opportunities. I recently attended a reception hosted by Queen Elizabeth at Buckingham Palace for Australians in the United Kingdom (a precursor to her Commonwealth Games visit to Australia). I was also pleased to celebrate both Australia Day and International Women's Day at Australia House – the majestic home of the Australian High Commission in London, and for all the Harry Potter fans out there, the movie setting for the wizard bank Gringotts!

With the exception of a brief holiday in Spain in early January, I have spent the winter in London, and my herbarium visits have therefore been restricted to the Linnean Society and Natural History Museum. At the latter, noise from the construction of the nearby Darwin Centre Phase Two frequently shatters the otherwise peaceful

ambience of the herbarium and botany library. This new building is due to open in 2008 and will house the Museum's insect and higher plant collections.

Kew news

Kaj Vollesen retired in January, with Phillip Cribb following suit in early March. David Simpson has replaced Phil as Assistant Keeper-Monocots. Chris Mills has commenced his new appointment as the Head of Library and Archives. Aaron Davis and Lucy Smith are currently on sabbatical in New South Wales, where they will remain until mid May. Dick Brummitt has spent much of February and March in New Zealand as part of a Kew collecting expedition targeting plants for the new Alpine House and adjacent rock garden. This new glasshouse is now open to the general public.

Revised plans for the new extension to the Herbarium and Library have been approved by the Richmond-upon-Thames Planning Committee.

Publications

Taxonomy and Plant Conservation (eds. E. Leadley & S. Jury; Cambridge University Press 2006). A tribute to the work of Professor Vernon Heywood, this new publication centres on the key role played by taxonomy in the conservation and sustainable utilisation of plant biodiversity. There are contributions from a range of distinguished botanists, including several Kew staff members.

Juliet Wege

Art competitions

Waterhouse Natural History Art Prize

Entries are now open in the 2006 Waterhouse Natural History Art Prize. Artists are invited to enter works in three categories: Paintings, Works on Paper and Sculpture and Objects.

Entry forms are available from the SA Museum, can be downloaded from this site or can be requested by calling 08 8207 7377.

Entries close 26 May 2006.

Web reference

www.samuseum.sa.gov.au

Margaret Flockton Award

Entries are now open in the 2006 Margaret Flockton Award. Entries (originals only) need to be submitted by close of business, Friday 26 May 2006. Artists selected for exhibition in the Margaret Flockton Award Exhibition will be notified in late June 2006. The prizewinners will be announced at the exhibition opening night in the Red Box Gallery on Wednesday 5 July 2006.

Web reference

[www.rbgsyd.nsw.gov.au/conservation_research/
herbarium_and_services/botanical_illustration/
margaret_flockton_award](http://www.rbgsyd.nsw.gov.au/conservation_research/herbarium_and_services/botanical_illustration/margaret_flockton_award)

Book reviews

A Flora of Australia macrofungal first

Review by **Bettye Rees**
University of New South Wales
Email: b.rees@unsw.edu.au

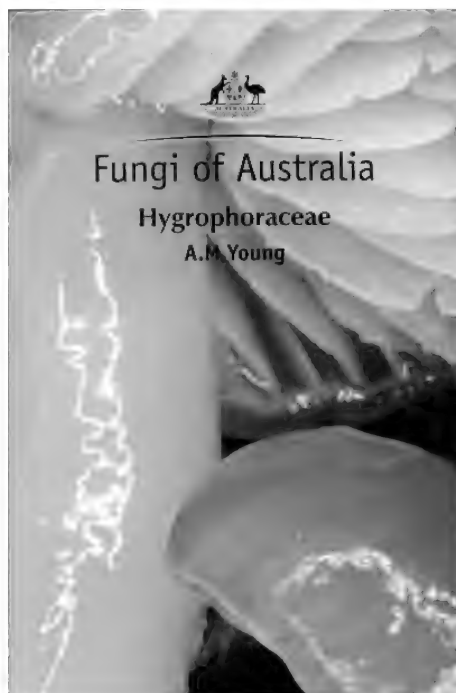
Hygrophoraceae. By A.M.Young, published by the Department of Environment and Heritage and CSIRO publishing.

It is an important occasion for all Australian mycologists to finally see, rolling off the press in hard copy, the first volume under the title *Fungi of Australia* which contains a treatment of Australian macrofungal species. The "Hygrophoraceae" by Dr A. M. Young follows a preceding treatment "The Genus *Mycena* in South-Eastern Australia" by Cheryl Grgurinovic, which was also produced in association with Australian Biological Resources Study but was not part of the *Fungi of Australia* series.

The Hygrophoraceae, or "wax caps", as they are commonly known, excite a great deal of interest worldwide due to their wide range of colours and habitats and to a growing role as indicators of pollution in the environment. In Europe they are more commonly found in grassland, whereas in Australia they tend to occur more frequently in closed forests. The occurrence of 25 species of the family along the banks of Gore Creek within a small gallery forest in the Lane Cove Bushland Park at the Western end of Sydney Harbour, rivals the number of wax cap species described from comparable relatively undisturbed "sites of special interest" in England. Due to the untiring efforts of local residents working in conjunction with Tony Young, Lane Cove Bushland Park has been listed on the Register of the National Estate, and the group of *Hygrocybe* species found there has been determined as an Endangered Ecological Community, a first for a fungal group in Australia.

The book, which carries no volume number, deals mainly with the white-spored family of gilled mushrooms, the Hygrophoraceae, occurring in Eastern Australia, but also includes a good deal of information about species collected in other states. It is an exceptionally handsome volume, maintaining the high standard set by the introductory volumes I A&B, II A&B of the *Fungi of Australia* published previously. It is not often the case that almost the entire subject matter of a Ph D thesis is included in a published work. The present volume not only contains information about the species occurring in Australia and their classification, but also the history of the family worldwide, its ecology, biogeography and conservation. The information is invaluable to an increasing audience of Australian (and overseas) readers, impatient for information about the species present in Australia and the processes by which they are determined.

The book contains 179 A5 sized pages with fulsome descriptions of 92 taxa comprising 84 species, with four additional varieties, and four un-named taxa for which insufficient information was recorded at the time of collection. These are accompanied by 60 extraordinarily high quality, coloured plates, grouped mostly four to a page, and 51 line diagrams of selected species. The classification of the species is essentially a distillation of the author's experience with the morphology of the family over 17 years of careful scientific endeavour, resulting in the publication of 19 separate papers devoted entirely to the Hygrophoraceae, and including changes of species identity and placement. Keys to species involve both field and microcharacters. Two



tribes containing five genera, and three subgenera are included, but no attempt has been made to group the species into sections based on shared morphological characters within the largest of the subgenera containing 52 species. The end result will not be in accord with classification schemes in use in some other countries such as New Zealand, but the author has provided convincing arguments in favour of the systematic position adopted, until such time as molecular work can be carried out on the species in Australia. Early results from the all too few molecular studies of the genera and species outside Australia, indicate a possible closer relationship between *Humidicutis* and *Hygrophorus* with *Camarophyllus* more distantly

related to *Hygrocybe* species, but these studies are inconclusive due to lack of sufficient data, and possibly bedevilled by misidentification such as is often encountered in other genera and species described outside Australia over a period of two hundred years.

It is difficult to fault the work, but the inclusion of colour plate figure numbers within descriptions of those species for which they are available, would eliminate the need to consult the index and speed up the process of species recognition. At AUS\$90 a copy, the book is to be thoroughly recommended for institutions, professional workers and serious students of field mycology.

A local Perth flora

Review by Alex George

'Four Gables', 18 Barclay Rd, Kardinya, W.A. 6163

***Perth Plants: A Field Guide to the Bushland and Coastal Flora of Kings Park and Bold Park, Western Australia.* By R.Barrett & Eng Pin Tay, Botanic Gardens & Parks Authority, West Perth. Pp ii, 414, soft cover, 15 × 21 cm RRP \$45.00**

This is the book for anyone needing to identify or find basic information on the more common plants (both native and exotic) of the Perth region. It covers 756 species, about a quarter of the flora of the greater Perth region, with more than 2500 colour photographs. No other current book gives such a comprehensive or clear coverage. As a field guide it's a little heavy, but the paper is of a quality to prevent illustrations and text from showing intrusively on the other side. The authors are botanists with the Botanic Gardens & Parks Authority.

A foreword by Steve Hopper, formerly CEO of Kings Park and Botanic Garden, sets the scene with a summary of the floristics and salient features of the plants of the region.

Then follow 10 pages discussing the historical background to Kings and Bold Parks, the vegetation and soils, conservation, fire and smoke, exotic species (which now include a number of indigenous species), plant classification and names. Bold Park, by the way, is a reserve of 437 hectares of mostly natural vegetation close to the coast, placed under the management of the Botanic Gardens and Parks Authority in 1998. Both Parks lie on the coastal plain, on consolidated dunes and limestone ridges. Inside each cover is a map showing the main features of each Park and there is a scale in cm at the foot.

There is an illustrated 'key' to families (and subfamilies of Fabaceae—the legumes are

treated as a single family, though the peas are allocated here to subfamily 'Fabaceae', not Faboideae – but correct in the main text). In fact, this 'key' lists the families in alphabetical order, cites the most important morphological features, with two colour plates for each and page reference(s) to the main text.

The nomenclature—from family to species—generally follows the latest research at all levels. Thus, Epacridaceae is included within Ericaceae, Sterculiaceae in Malvaceae, and *Eremophila* is placed in Scrophulariaceae. All the segregate monocot families are followed, but classification tends towards the conservative in Orchidaceae, a family (in Australia at least) currently confused by several systems. Several taxa are included on the basis of a sight record and almost certainly do not occur in Bold or Kings Park as they prefer granitic or lateritic soil, e.g. *Cristonia biloba*, *Grevillea pilulifera*.

The taxonomic section is colour-coded with a strip along the upper right margin: pale green for indigenous ferns, cycads and pines, dark green for indigenous laurels and dicotyledons, blue for indigenous monocotyledons, orange for naturalised pines, red for naturalised dicotyledons, and yellow for naturalised monocotyledons. It's debatable whether separating indigenous and naturalised species of the same family assists the user who may be unable to decide the status of their plant—especially given the increasing number of native species becoming naturalised in the area. Authors are given for all scientific names, and common names are included. Recently used synonyms and alternative names are cited. An asterisk denotes an introduced taxon, used both after the first mention of a family name in the first 3 sections if it also includes such taxa in the

area, and before the taxon name in the last 2 sections.

For each illustrated taxon, the left-hand page has brief descriptive text (mostly taken directly from *FloraBase*, database of the Western Australian Herbarium, except that en rules have changed to hyphens), the distribution with a small map, and a note on the occurrence in the Parks. On the right-hand page is a set of up to 22 images (usually 3 or 4 per species), sometimes with additional ones at the foot of the left-hand page. Very usefully, for similar taxa (e.g. in *Crassula*) for which the *FloraBase* text does not indicate diagnostic features, an additional note is given.

Flower colour is given in the unrelated format of *FloraBase*, without any attempt to differentiate between floral parts, populations, change with age etc., e.g. *Daviesia triflora* 'yellow, orange, red, black', *Banksia ilicifolia* 'white, cream, pink, yellow, red'.

Photographic quality generally is good, but a very few are too small to be effective, e.g. that of a grass habit (p. 27); *Senecio hispidulus* (p. 53 pl. 1), or too dark, e.g. *Phlebocarya ciliata* (p. 199 pl. 5), *Linum usitatissimum* (p. 319 pl. 7). Some subjects are lost against the background, e.g. *Hypochaeris glabra* and *H. radicata* (p. 273 pls 7, 10) are too indistinct to show the difference between them. A few are duplicates at different scales, e.g. *Acacia lasiocalyx*, (p. 311 pls 11 and 12); *Lachenalia mutabilis* (p. 355 pls 6, 7), or are very similar, e.g. *Hakea trifurcata* (p. 147 pls 2-4). It is excellent to see illustrations of the fruit of many species not usually shown, e.g. *Cartonema philydroides* (p. 177 pl. 6), *Logania vaginalis* (p. 111 pl. 8), *Caladenia arenicola* (p. 215 pl. 8), including many weedy species that one often sees only at this stage. For a few species that the authors could not photograph live, dried specimens are shown.

There is a note under those species that flower only after fire, and one photo of *Allocasuarina fraseri* (p. 57 pl. 5) shows the epicormic shoots after fire nicely.

In most genera, species in the region besides those illustrated are discussed briefly in the text.

Distribution is taken from *FloraBase* in which many early errors have now been resolved. *Diplopeltis huegelii* subsp. *huegelii*, however, does not occur as far north as Shark Bay, reaching no further than Three Springs. *Grevillea crithmifolia* occurs mainly between Mandurah and Wanne-roo, not from Dongara to Margaret River though there is a record for Dongara that requires confirmation. *Melaleuca huegelii* subsp. *huegelii* extends no further north than Walkaway near Geraldton.

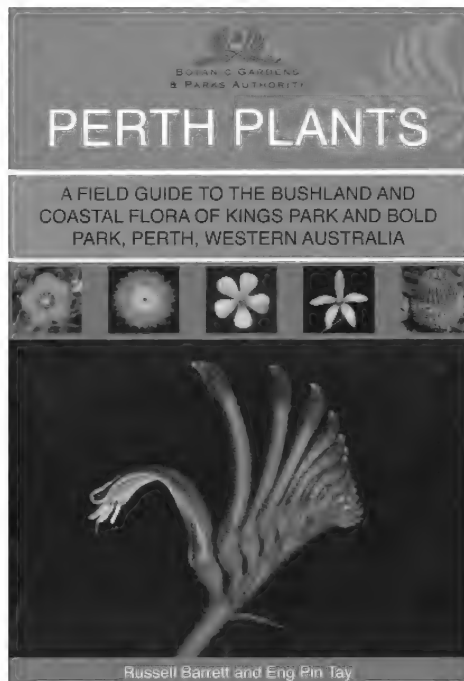
More attention could have been given to sexuality. In Gyrostemonaceae and *Phyllanthus*, the sexes are confused, the male flowers illustrated being designated in the text as female and vice versa for the females. *Alexgeorgea* is stated to have 'only the tips of the anthers showing above the soil surface when flowering'; this should read 'only the stigmas ...'. For

some dioecious species the sex of the flowers illustrated is not mentioned in the text, e.g. for *Adriana*, *Dioscorea*, *Lomandra*, *Lyginia* and *Pimelea argentea*. In some grasses and sedges we are not told that plates show flowers at the male or female stage.

An appendix lists species recorded for Kings Park and Bold Park but not considered naturalised. There is a glossary of relevant terms, a useful bibliography and a combined (hooray!) index to scientific and common names (but not to those in the Introduction).

It is interesting to note that many indigenous taxa from both within W.A. and other States (e.g. 11 species of *Acacia*) are naturalised—a warning to anyone growing Australian plants to watch out for any tendency to escape.

I noted just one misidentification: *Hakea pycnoneura* p. 337 appears more like *H. multilineata*, while in Appendix 1, *Tristania conferta* is now *Lophostemon confertus*.



Some manuscript and provisional names are used. It will be good when this practice disappears from Australian plant publications.

There are no diacritics on authors' names, e.g. 'Ave-Lall' (p. 36), 'A. & D.Love' (p. 186), 'G.Lopez' (p. 288), 'L'Her.' (p. 316). A few typographical errors have slipped through ('who's' instead of 'whose', 'gadens' instead of

'gardens'), likewise there is some faulty punctuation (e.g. 'however' always used with no commas), and there are several discrepancies between the number of a subject and its verb.

Overall, however, this book brings together, successfully, a huge amount of data in a compact, user-friendly way and it deserves to do well. The price is very reasonable.

Bioinformatics

Review by David A Morrison

Department of Parasitology (SWEPAR), National Veterinary Institute,
751 89 Uppsala, Sweden
E-mail: David.Morrison@bvf.slu.se

Instant Notes: Bioinformatics. By David R. Westhead, J. Howard Parish and Richard M. Twyman. 2002. BIOS Scientific Publishers, Oxford. x+257 pp. ISBN 1-85996-272-6 £18.99 (paperback).

Bioinformatics for Dummies. By Jean-Michel Claverie and Cedric Notredame. 2003. Wiley Publishing, Hoboken, NJ. xx+452 pp. ISBN 0-7645-1696-5 £22.50 (paperback).

Associated web site:

www.dummies.com/WileyCDA/DummiesTitle/productCd-0764516965.page-1.html

Bioinformatics is an idea that originated in the late 1960s, when systematists first started seriously considering the practical application of computer technology to biology, in the form of specimen databases, interactive identification, and phylogenetic analysis. Subsequently, the widespread application to biology of the advances in information technology was probably inevitable, when computers became cheaper and more powerful during the 1970s. However, the idea of bioinformatics as a separate discipline had to wait for the development of molecular biology in the 1980s, when its full potential was realized in the mainstream disciplines of biology. Since then, bioinformatics has been the fastest growing field within the biological sciences, expanding rapidly during the 1990s to create a fusion of biologists, mathematicians and computer scientists the like of which had not been seen before.

This situation has, however, left the systematists in somewhat of an awkward position: although they can reasonably claim to be the founders of bioinformatics, and specimen databases, interactive identification and phylogenetic analysis have all developed along with the other parts of bioinformatics, many systematists are likely to feel that they have been left somewhat behind. After all, if the money that was spent on the Human Genome Project had been spent on biodiversity inventories instead, we would be a

long way towards having a global inventory by now, and the profession of systematics would be a lot healthier. This also means that keeping abreast of technological advances is becoming harder and harder for the average systematist; and it is hard enough just to understand what new possibilities are arising, let alone whether they might be of direct relevance to systematic research. Thus, it may be handy to have an introduction to the broader field of bioinformatics, so that when talking to a gene jockey or a computer whiz we can at least ask intelligent questions.

Sadly, there is no book called "Bioinformatics for Evolutionary Biologists / Systematists", even though other disciplines have such books; for example, geneticists have the book by Barnes and Gray (2003) and immunologists have the one by Lund et al. (2005). Therefore, there appears to be an unfilled niche here, which someone might like to fill, given that there seems to be a new book with the word "Bioinformatics" in the title published every month or so. In the meantime, systematists will have to delve into more generalist books in order to find what we are seeking. The two books reviewed here are intended to fill that more generalist niche.

While these books are not written specifically for systematists, they are both written for the type of person that a systematist might be: someone who knows quite a lot about biology and yet feels that they should know more about bioinformatics than they currently do but who doesn't (so far) feel the need to delve too deeply. This is a tricky sort of book to write, as there is a thin tightrope to walk between simplifying the information and being downright misleading. In fact, such authors probably can't win whatever they do, because any "expert" will always be able to see that their particular field has been "grossly distorted" during the abridgement.

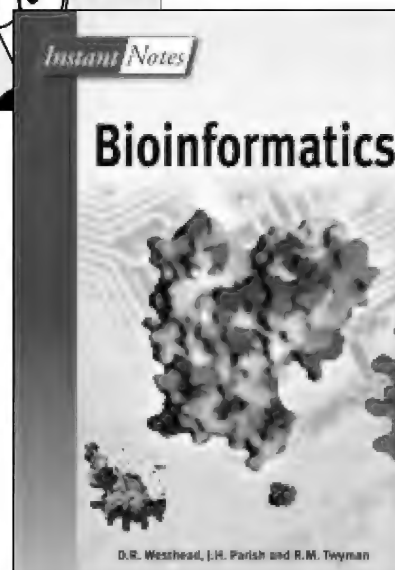
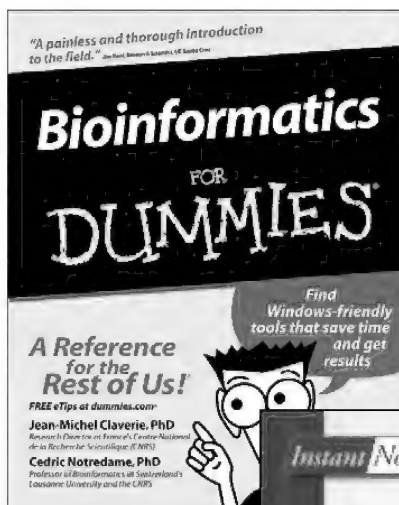
The format and style of each of the books is predetermined by the series of which it is a part. The

Notes series is the more sober of the two, with the *Dummies* series having a tendency to sound like it doesn't take things too seriously — I am never sure who the “dummy” is supposed to be with this series of books: the reader, the writer, or even the publisher. The *Dummies* book is arranged as a series of practical exercises, which are best performed while sitting at an internet-connected computer, which gives it a strong flavour of a cookbook. Thus, a simplistic comparison might suggest that the *Notes* book is generally stronger on the theory while the *Dummies* book is generally stronger on the practice. However, this generalization is not always true, as the *Dummies* book gets the theory across although it does it in a very different way.

The books also differ in the depth and breadth of coverage of the topics. The *Dummies* book concentrates very much on amino acid sequences, covering sequence annotation, database searches, sequence alignment and comparison, and protein structure prediction. From there it expands out into nucleotide sequences, including both protein-coding and RNA-coding. The *Notes* book also covers these subjects, but it includes many other topics as well, such as microarrays, proteomics, molecular pathways, and what it chooses to call cheminformatics and pharminformatics (although the discussion of most of these extra topics is mainly about molecular biology rather than about bioinformatics itself). So, the *Notes* book is literally a notebook, covering a lot of themes but each one in less detail. It is also more pedagogically formal in its presentation (i.e. it is much closer to a teaching book), while the *Dummies* book allows itself to wander from topic to topic (but in a controlled manner).

Interestingly, there are many relevant practical topics that are also not discussed by either book. For example, neither book tells you that doing a database search using a nucleotide sequence may produce no matches while a search of the same data translated to amino acids can produce a lot of (correct) matches. Neither book talks about all of the molecular data for which databases do not yet exist, such as AFLP, ISSR, RAPD and microsatellites (unless the person has sequenced

each microsatellite for each sample). Similarly, neither book warns you about the practical details of computerized data analysis. The biggest bane of my computing life is dealing with the fact that every computer program treats “nexus format”, “phylip format”, “fasta format”, etc in its own unique way, so that moving a file smoothly from one program to another is the exception rather than the rule. Furthermore, neither book talks much about computing itself, as both of them assume that the reader will be dealing only with user-friendly programs, and in the *Dummies* case only with



online programs at that. In science, it can be a serious mistake to treat user-friendliness or accessibility as the primary criterion for choosing a data analysis.

Overall, I think that each book is successful at what it sets out to achieve. The authors clearly have chosen to emphasize different information, and they have taken two very different approaches as to how to present that information. Which book you might choose will depend on your own inclination — I would choose the *Notes* book if I wanted breadth of coverage, but the *Dummies* book if I wanted practical details about a narrower range of topics.

However, there can be two sources of general criticism that can be levelled at both books, which are worth looking at in more detail. The first was alluded to above: expertise in a field inevitably leads to criticism of any attempt to simplify that expertise. In this case, the weakest part of each book for a systematist will obviously be the presentation of phylogenetic analysis. In fact, if you were to judge the intellectual quality of either book by first reading the phylogeny chapters then you probably wouldn't bother reading the rest of the book, but would instead merely use it to prop open the kitchen door.

A few comparative quotations from the glossaries [with comments] will illustrate the sorts of difficulties that both books get into:

- *Phylogenetics. Dummies*: Reconstruction of the evolution [sic] history of a gene family based on gene comparison. [Apparently gene trees are all there is, rather than species trees.] *Notes*: The branch of science that deals with resolving the evolutionary relationships between organisms. [Better, but it doesn't distinguish population genetics from systematics.]
- *Clade. Dummies*: Group of related species and their common ancestors. [Doesn't distinguish paraphyly from monophyly.] *Notes*: A group of organisms descended from a particular common ancestor (i.e. an ancestor and all of its descendants). [Saved by the bit in brackets.]
- *Alignment. Dummies*: Representation of two or more protein or nucleotide sequences where homologous amino acids or nucleotides are in the same columns while missing amino acids or nucleotides are replaced with gaps. [This emphasizes the philosophy only, which is homology assessment.] *Notes*: Arrangement of two or more nucleotides of protein sequences to maximize the number of matching monomers. [This emphasizes the practice only, which is entirely similarity.]

Given this background, it will not surprise you to learn that the *Notes* book presents an "example of an actual cladogram" that is unrooted but on which "clades" are recognized (which flatly contradicts the given definition of a clade), and which has a branch missing so that the diagram is not completely connected (and the *Dummies* book apparently had similar sorts of problems in the early printings, which have since been corrected). I won't list the other infelicities in the two books, or I might start foaming at the mouth. I will merely point out that the rest of each book is better than its phylogenetics section (and the same can be said of the book by Lund et al., 2005, which is actually much worse than these two). My main concern in raising this issue is

that these books probably reflect a view of phylogenetics that is quite widespread, where expertise in phylogenetic analysis is not credited to systematists as a group but is seen as being a general skill that anyone can acquire without much effort. The quality of phylogenetic analyses in the scientific literature is not always high, presumably because many practitioners do not realize the effort that is needed in order to do a good job. There is a real danger that too much emphasis on bioinformatics could turn biology from a science into a series of algorithms.

The second general criticism is that these two books take an entirely positive attitude to their subject, dwelling lovingly on the prospects and opportunities created by bioinformatics, so that both books come across as almost entirely uncritical. It is essential in science, in particular, that quality be assessable and assessed, but neither of these books addresses the issue of how this might be done using the bioinformatics tools that they extol and the data sources that they recommend. The best that either of them does is to have occasional reminders that database searches, for example, are not always reliable, along with some hints as to what to be wary of. My point should be seen as a general criticism of bioinformatics, in its current state of development, rather than a specific criticism of these particular books — the books are merely reflecting the general attitude of far too many bioinformatics practitioners, which is that quality control is someone else's problem. There is a strong tendency in bioinformatics to produce what mathematicians refer to as "analyses untouched by the human mind", and even to present this as a desirable thing. I don't see how any serious scientist could agree with this attitude.

The lack of critical thinking can also be seen in a number of university bioinformatics courses, especially those based on the principle of using on-line servers for data analysis. Many of these courses (especially short courses) simply equate computer programs with their analyses, and therefore deal only with those *programs* they consider to be "popular" rather than with which *analyses* are "best". They thus concentrate on what resources are available rather than on any assessment of the quality or usefulness of those resources. Their emphasis on "quick" methods only gives beginners a wrong impression, emphasizing the need to get a result rather than to be judicious about that result. In this environment, we cannot expect much in the way of a critical approach to data and analysis in bioinformatics. This attitude is not unusual in biology, of course, being also shown in the popularity of Microsoft Excel as a tool for scientific data analysis in spite of a long series of

published critical evaluations demonstrating its inaccuracies and inadequacies, thus reflecting the primacy of convenience over quality for many people.

This leads me to wonder exactly what it is that scientist users of bioinformatics are going to do about quality control, since the expert practitioners and developers have so far shown little inclination to do very much. We, also, have done relatively little so far, and yet we must do something if we are to benefit from bioinformatics without being lead astray. For example, we cannot simply download data from a database, combine it with our own data, and then produce a phylogenetic analysis. This is because most databases are uncured, which means that there is no quality control whatsoever, and so you can't tell the good information from the bad. Every bioinformatics project on which I have worked has required me to spend as much time checking inconsistencies and contradictions in the downloaded data as it has collecting the new data, which seems almost to defeat the purpose of having the database in the first place. Even curated databases have their problems (e.g. I once found a gross error in a structure in the Rfam database), but then at least there is someone you can contact about it to have the problem fixed. In introductory books such as the ones discussed here, a chapter on quality control would add a suitable sobering note to the general euphoria, without necessarily detracting from the overall positive ambience.

For anyone wishing to pursue bioinformatics in more detail, the next step up from these two books consists of undergraduate textbooks. The two currently most popular books are those of Higgs and Attwood (2005) and Lesk (2005), although the book by Gibson and Muse (2004) contains much that will be of interest to evolutionary biologists. The next step up from there will take you into the specialist literature, where there is a rapidly expanding number of books available on various topics (especially those related to computing itself). Sadly, none of these books recognize the role that systematists played in the origin of bioinformatics, as this word is now seen as being synonymous with "molecular bioinformatics", the rest presumably being seen as "taxonomic computing" (a term that should not be despised, given the ongoing importance attached to the electronic dissemination of systematic data). Nor do any of the books present things in a way that would be directly relevant to practical phylogenetics studies. This seems to leave an unfilled niche in the publishing world, which one of you might feel inspired to fill.

References

- Barnes, M. R., and I. C. Gray (eds). (2003) *Bioinformatics for geneticists*. John Wiley and Sons, New York.
- Gibson, G., and S. Muse. 2004. *A primer of genome science, second edition*. Sinauer Associates, Sunderland, MA.
- Higgs, P. G., and T. K. Attwood. 2005. *Bioinformatics and molecular evolution*. Blackwell Publishing, Oxford.
- Lesk, A. M. 2005. *Introduction to bioinformatics, second edition*. Oxford University Press, Oxford.
- Lund, O., M. Nielsen, C. Lundegaard, C. Kesmir, and S. Brunak. (2005) *Immunological bioinformatics*. MIT Press, Cambridge, MA.

Nitrogen fixation in Acacias

Dan Murphy

Royal Botanic Gardens Melbourne

***Nitrogen Fixation in Acacias: an untapped resource for sustainable plantations, farm forestry and land reclamation.* By John Brockwell, Suzette D. Searle, Alison C. Jeavons and Meigan Waayers. ACIAR Monograph No. 115, 132 pp. Published by Australian Centre for International Agricultural Research (ACIAR), 2005. ISBN 186320489.**

This book is a review of the literature dealing with the associations between acacias and root-nodulating rhizobial bacteria, but it also includes original observations and interpretation of this literature. A particular emphasis has been placed on an examination of the symbiosis between legumes and rhizobial bacteria, the ability of this symbiosis to fix atmospheric nitrogen, and how this may be enhanced and utilised.

After a brief introduction (Chapter 1), I initially thought that the chapters of most interest to readers of this newsletter would be chapters two and three, which focus on the plants and bacteria, including their taxonomy and systematics. However, these chapters only make up a minor proportion of the book, and are not the most readable parts. The chapter on the acacias (Chapter 2 – The Plants) is relatively brief, and the discussion of taxonomy a little confusing because it does not explain why taxonomic changes are necessary in *Acacia*. I thought it may have been useful to include the implications of the non-monophyly of *Acacia sensu lato* and how this has impacted on the understanding of the patterns of nodulation and symbiosis. For example, now that we know that members of the mimosoid legume tribe Ingeae (including genera

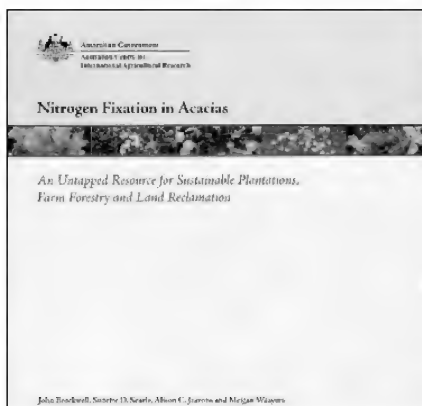
such as *Calliandra* and *Inga*) are the closest relatives of the “Australian acacias”, how does this impact on the understanding of the groupings within the rhizobial bacteria? Chapter 3 (The bacteria) reflects the complexities of the bacterial taxonomy and the current state of upheaval in the systematics of this group. The book is clearly focussed on the rhizobial bacteria and specifically the symbiosis between acacias and root-nodulating bacteria, and the subsequent chapters, which introduce the nature of the symbiosis between legumes and rhizobial bacteria, are where the authors shine.

Chapter four (The Symbiosis) explains the importance of N-fixation to agriculture and the difficulties encountered to exactly measure the amount of N fixed. The factors that influence the amount of nitrogen fixed by an acacia host and rhizobial partner, such as nutrient and nitrate content of soils, salinity and soil fauna, are also covered in this chapter. Chapter five (Enhancement of the symbiosis), outlines ways that the symbiosis between rhizobia and acacias may be improved – principally by means of inoculation of seedlings with an appropriate rhizobia to ensure initial establishment of root nodules.

In chapter six (Exploitation of the symbiosis), the many ways that the N-fixing symbiosis between acacias and root-nodulating bacteria may be harnessed and used are described in detail. I was fascinated to learn about the ability of intercropped legumes to transfer underground nitrogen to non-legumes (pp. 80-82). The authors speculate on a possible mechanism involving mycorrhizal activity for N-transfer and I imagine this would make an extremely interesting and fruitful line of research. Finally, a thoughtful conclusion and summary is given in chapter 7 (General conclusions and prognosis), which also clearly demonstrates that research into the symbiosis between acacias and rhizobial bacteria has been neglected in comparison to studies of other legumes. This may be seen as an opportunity for further research now that such holes in the literature have been identified.

It is notable that the monograph focuses on the utilisation of acacias, an area that has seen

significant growth and the realisation of potential in recent years. A good example is the Kamarooka project of the Northern United Forestry Group north of Bendigo in Victoria (www.nufg.org.au/Kamarooka%20Project.htm), where acacias, along with other salt tolerant plants, are being grown for agroforestry and agricultural production on highly salt affected land. What is original with this book is that the authors explain that the exploitation of acacias may be significantly improved by an understanding of root nodulation and nitrogen fixation.



The layout of the book is clear and the photographs and figures are generally good, although some of the best photographs are very small. The lack of an index is an unfortunate omission and some minor errors have crept into the reference list. For example, the Lewis *et al.* “Legumes of the world” book was published in 2005, not 2001. A number of papers (marked by an asterisk in the bibliography) are cited as being part of the program and abstracts from the Fourth

International Legume Conference, in Canberra in 2001. The authors mention that some of these papers were published in Klitgaard and Bruneau (2003), which is incorrectly cited as part 1 rather than part 10 of the Advances in Legume Systematics series. Surprisingly, it seems that the papers resulting from that conference that were specifically devoted to acacias have been overlooked; these were published in a special volume of *Australian Systematic Botany* (vol. 16(1), also titled as Advances in Legume Systematics Part 11).

Overall this book provides a very useful summary of nitrogen fixation in acacias, including a large amount of literature published in difficult to access and obscure sources. It really is more than a literature review and often presents new and original information, likely to stimulate much needed further research in this area. By clearly explaining the significant opportunities available to exploit the N-fixing symbiosis between rhizobial bacteria and acacias the authors have interpreted a specialised field for a broader audience. I found it surprisingly readable and I am sure I will use this monograph as a reference source in the future.

Exhibitions of interest

Flora Tasmanica exhibition at Canberra Botanic Gardens

Flora Tasmanica will be on display at the Canberra Botanic Gardens Visitor Centre from 5 April until July 2006.

This exhibition features the works of renowned Tasmanian wilderness photographer, the late Peter Dombrovskis, Les Blakebrough, regarded as one of Australia's greatest ceramic artists and Lauren Black, a highly regarded botanical artist (Fig. 1). This exhibition was previously on display at the Plimsoll Gallery, University of Tasmania where it was opened by HRH Crown Princess Mary of Denmark in March 2005. The exhibition was opened in Canberra by Gintaras Kantvilas whose opening address is reproduced in this newsletter (p. 25).

400 Years of Dutch history – Sydney and Canberra exhibits

It is 400 years since the Dutch ship *Duyfken* landed on Australian shores. There are a number of events planned in each state and the *Duyfken* replica is sailing around the Australian coast-line as part of celebrations marking this occasion. Information on activities planned for, or already held, for each state, together with an itinerary for

the *Duyfken* can be found at Web ref. 1.

Part of the celebrations include the exhibition *First Sight: the Dutch mapping of Australia 1606–1697* at the State Library New South Wales, which features Dirk Hartog's original pewter plate placed on Dirk Hartog Island in 1616. The exhibition runs from 6th March to 4th June (Web ref. 2).

The National Library in Canberra is also part of this national initiative. Throughout 2006, the Map Reading Room will display large copies of rare maps to highlight the discovery and charting of the Australian coastline. It has just purchased two new maps, one c. 1683 and the other 1703 (Web ref. 3).

Web references

- Web ref. 1. www.australiaonthemap.org.au/duyfen.html
Web ref. 2. www.atmitchell.com/events/current.cfm#firstsight
Web ref. 3. www.nla.gov.au/news/index.html#heading3

Botanical illustrations in Sydney

The State Library has more of interest in the Heritage Collection 2006 display with botanical illustrations by Harriet and Helena Scott and 1719 illustrations of fish (Web ref. 1).

Web reference

- Web ref. 1. www.atmitchell.com/events/current.cfm



Fig. 1. Image from the *Flora Tasmanica* exhibition web page (www.anbg.gov.au/anbg/exhibitions/flora-tasmanica/index.html)

Joseph Lycett art exhibition for Sydney, Newcastle and Canberra

1 April – 18 June 2006, Museum of Sydney
8 July 2006– 27th August 2006, Newcastle Region
Art Gallery

Canberra – dates to be advised

Developed by the State Library of New South
Wales, The Historic Houses Trust and The
National Library of Australia.

Joseph Lycett: convict artist, will be the first exhibition to examine the life and work of one of Australia's earliest accomplished artists, Joseph Lycett, born about 1775, died 1828. His works in watercolour and oil are among the most important visual records of early New South Wales and Tasmania, documenting the life of the Aboriginal people, the landscape and its flora, and the towns, houses and properties of colonial Australia from a time when there were few competent artists in the colony. This exhibition, brought together by an expert curatorial team, will present new interpretations and a new appreciation of the accomplishments of this elusive figure and the colonial landscape he captured in his art (Web ref. 1).

Web reference

Web ref. 1. [www.hht.net.au/museums/mos/
exhibitionswhats_on#lycett](http://www.hht.net.au/museums/mos/exhibitionswhats_on#lycett)

Cook exhibition in Canberra

Cook's Sites, a touring exhibition of Historic Houses Trust of New South Wales, opened at Canberra's National Library of Australia, Exhibition Gallery on 16 March and will be on display until 18 June 2006.

Rarely seen original items from the National Library's collections complement the exhibition. These include Hawaiian *tapa* or hand-beaten bark cloth, likely to have been collected in Hawaii in 1778–79 during Cook's third voyage, watercolours from the Rex Nan Kivell Collection, and engravings depicting scenes from New Zealand and Australia.

On display also are botanical specimens collected in Botany Bay in 1770 on loan from the National Herbarium (Botanic Gardens Trust) in Sydney and original material collected on Cook's voyages lent by the Australian Museum in Sydney. These items are supported by texts, documents and original ethnographic and scientific specimens.

Further information can be seen in the press release at www.nla.gov.au/pressrel/2006/cook.html

Australian landscapes in Canberra

While you are at the National Library you might be interested in catching *Country and Landscape* with images by colonial artists such as S.T. Gill, John Glover, Joseph Lycett, Conrad Martens, Eugene von Guerard and William Westall. The exhibition runs from 15th April to 9 July 2006

Lhotsky's journal

Note too that the National Library has also just purchased John Lhotsky's *Journey From Sydney to the Australian Alps*. The book documents Lhotsky's journey and exploration of the Snowy Mountains in 1834 (Web ref. 1)

Web reference

Web ref. 1. www.nla.gov.au/news/index.html#heading3

Conferences

Acacia 2006: Knowing and Growing Australian Wattles

Melbourne, Victoria, 25-28 August 2006

Sponsors: Australian Plant Society, Victoria &
Royal Botanic Gardens Melbourne

Contacts: Sue Guymer
(acacia2006.melbourne@netlink.com.au) or Dan
Murphy (daniel.murphy@rbg.vic.gov.au)

Website: www.rbg.vic.gov.au/acacia2006/

The call for papers and abstracts for the *Science behind Acacia* symposium closes on 26th May 2006

The Impact of Peter Raven on Evolutionary and Biodiversity Issues in the 20th and 21st Centuries

This, the 53rd Annual Systematics Symposium at the Missouri Botanical Garden will be held on 13-14 October 2006.

Registration fee is 75 USD. Visit [www.mobot.org/
MOBOT/research/symposium/register2006.shtml](http://www.mobot.org/MOBOT/research/symposium/register2006.shtml)

Websites of interest

New York Digital Library

NYPL Digital Gallery (Web ref. 1) provides access to over 450,000 images digitized from primary sources and printed rarities in the collections of The New York Public Library, including illuminated manuscripts, historical maps, vintage posters, rare prints and photographs, illustrated books, printed ephemera, and more. As you can see this site has all sorts of images – but have a look at their superb reproduction of Fitch's illustration of *Victoria amazonica* as an example

Looking for an artist?

Science-Art.com (Web ref. 2) is a site set up to connect artists of science, nature and medical images with those who need them. You can either search for an image you like and contact the artist directly for permission to use it, or commission the artist to do work for you. Most

of the artists presently listed on the site are American or Canadian, but maybe it is something that Australian illustrators might look at emulating.

Key to Tasmanian Dicotyledons

Make your day – have a look at Greg Jordan's *Key to Tasmanian Dicotyledons* (Web ref. 3) and marvel over the fantastic photographs of the Tasmanian flora by using the remarkably simple key.

Web references

Web ref. 1. <http://digitalgallery.nypl.org/nypldigital/index.cfm>

Web ref. 2. www.science-art.com/

Web ref. 3. www.utas.edu.au/dicotkey/DicotKey/key.htm

Jenny Barker is thanked for supplying the last two sites. Ed.

From Taxacom

¹²I long ago gave up on subscribing to Taxacom, because of the volume of mail, but I still browse the archives to find out what is being discussed.

In the last three months there have been intense discussions on the various interactive key programmes, the use of colour in SEM images, search engines and their possibilities and some quite long discussion, by predominantly zoologists, about making it illegal to name an organism after yourself. This last topic was something I had started to compile at one stage, and had got as far as *Brunonia* R.Br., *Potentilla crantzii* Crantz, *Cotoneaster lavalleyi* Herincq ex Lavalley and *Loranthus miquellii* Miq. Maybe you have some more to add to the list.

There has also been a thread on phantom names, unpublished names or names which don't really exist, that have found their way on to the internet through databases.

New World Checklist of Selected Plant Families website

The Royal Botanic Gardens, Kew launched this new website in February (www.kew.org/wcsp/)¹³. It contains global checklists on 106 plant families, providing name, place of publication, global

distribution and life form. If you use the website for your research, please don't forget to cite it.

New version of Kew Bibliographic Databases

The web interface for the *Kew Bibliographic Databases* has been relaunched at www.kew.org/kbd/searchpage.do

A Spanish digital botanical library

The digital library of the Real Jardín Botánico, CSIC, Madrid, is now available at <http://bibdigital.rjb.csic.es/ing/index.php>. Books are mainly related to Iberian flora but also to Latin-American and Philippines floras and other classical botanical works. High-quality images in pdf format are provided.

London plane tree: a word of warning?

Richard Jensen (rjensen@saintmarys.edu) indicated that he had received nine replies to his query re naturalization of London plane tree in North America. He recorded it as being naturalized in California, Massachusetts, New York, Ontario, and Pennsylvania. While it has not yet been recorded in the census of any Australian state, with the exception of Western Australia, its wide planting as a street tree in the last few years in Adelaide, at least, presumably means that it is yet another we will be adding to other southern State censuses in the future.

Robyn Barker

¹² From <http://listserv.nhm.ku.edu/archives/taxacom.html>

¹³ Peter Wilson independently sent news to the APC group that Myrtaceae, with which he had a fair amount of involvement over the past 12 months was now live on the Kew website at www.kew.org/wcsp/myrtaceae

ASBS Publications

History of Systematic Botany in Australia

Edited by P.S. Short. A4, case bound, 326pp. ASBS, 1990. \$10; plus \$10 p. & p.

For all those people interested in the 1988 ASBS symposium in Melbourne, here are the proceedings. It is a very nicely presented volume, containing 36 papers on: the botanical exploration of our region; the role of horticulturists, collectors and artists in the early documentation of the flora; the renowned (Mueller, Cunningham), and those whose contribution is sometimes overlooked (Buchanan, Wilhelm).

Systematic Status of Large Flowering Plant Genera

Austral.Syst.Bot.Soc.Nsltr 53, edited by Helen Hewson. 1987. \$5 + \$1.10 postage.

This Newsletter issue includes the reports from the February 1986 Boden Conference on the "Systematic Status of Large Flowering Plant Genera". The reports cover: the genus concept; the role of cladistics in generic delimitation; geographic range and the genus concepts; the value of chemical characters, pollination syndromes, and breeding systems as generic determinants; and generic concepts in the Asteraceae, Chenopodiaceae, Epacridaceae, *Cassia*, *Acacia*, and *Eucalyptus*.

Australian Systematic Botany Society Newsletter

Back issues of the Newsletter are available from from *Number 27* (May 1981) onwards, excluding *Numbers 29, 31, 60-62, 66, 84, 89, 90, 99, 100 and 103*. Here is the chance to complete your set. **Cover prices** are \$3.50 (*Numbers 27-59*, excluding *Number 53*) and \$5.00 (*Number 53*, and 60 onwards). **Postage** \$1.10 per issue, apart from \$1.75 for the *Large Genera* issue (*Number 53*).

Evolution of the Flora and Fauna of Arid Australia

Edited by W.R. Barker & P.J.M. Greenslade. Peacock Publications, ASBS & ANZAAS, 1982.
\$20 + \$8.50 postage.

This collection of more than 40 papers will interest all people concerned with Australia's dry inland, or the evolutionary history of its flora and fauna. It is of value to those studying both arid lands and evolution in general. Six sections cover: ecological and historical background; ecological and reproductive adaptations in plants; vertebrate animals; invertebrate animals; individual plant groups; and concluding remarks.

Also available from. Peacock Publications, 38 Sydenham Road, Norwood, SA 5069, Australia.
(To obtain this discounted price, post a photocopy of this page with remittance).

Ecology of the Southern Conifers (NOW OUT OF PRINT)

Edited by Neal Enright and Robert Hill.

ASBS members: \$60 plus \$12 p&p non-members \$79.95.

Proceedings of a symposium at the ASBS conference in Hobart in 1993. Twenty-eight scholars from across the hemisphere examine the history and ecology of the southern conifers, and emphasise their importance in understanding the evolution and ecological dynamics of southern vegetation.

Postage rates: Those quoted apply only within Australia. Please e-mail for prices to other locations.

Send orders and remittances (payable to "ASBS Inc.") to:

Helen Thompson
ASBS Sales
ABRS
GPO Box 787
CANBERRA, ACT 2601, Australia

Or fax credit card details to:

Helen Thompson
Fax: 02 6250 9448

Contact details: Email: helen.thompson@deh.gov.au, Ph. 02 6250 9445; Fax 02 6250 9448

ASBS Chapter Conveners

Adelaide

Robyn Barker
State Herbarium of South Australia
Dept for Environment & Heritage
P.O. Box 2732
KENT TOWN, SA 5071
Tel: (08) 8222 9348
Email: barker.robyn@saugov.sa.gov.au

Armidale

Jeremy Bruhl
Department of Botany
University of New England
ARMIDALE, NSW 2351
Tel: (02) 6773 2429

Brisbane

Laurie Jessup
Queensland Herbarium
Mt Cootth Road
TOOWONG, Qld 4066
Tel: (07) 3896 9320

Canberra

Vacant

Cairns

Mark Harrington
James Cook University
CAIRNS, Qld
Further details to come

Darwin

Philip Short
Northern Territory Herbarium
Parks & Wildlife Commission of the NT
PO Box 496
PALMERSTON, NT 0831
Tel: (08) 8999 4512

Hobart

Andrew Rozefelds
Tasmanian Museum and Art Gallery
GPO Box 1164
HOBART, Tasmania 7001
Tel.: (03) 6211 4148
Email: andrew.rozefelds@tmag.tas.gov.au

Melbourne

Frank Udovicic
Royal Botanic Gardens Melbourne
Birdwood Avenue, SOUTH YARRA Vic 3141
Tel: (03) 9252 2313
Email: frank.udovicic@rbg.vic.gov.au

Perth

Jenny Chappill
Department of Botany
University of Western Australia
NEDLANDS, WA 6009
Tel: (08) 9380 2212

Sydney

Hannah McPherson
National Herbarium of NSW
Mrs Macquaries Road
SYDNEY, NSW 2000
Tel: (02) 9231 8111

Contacting Major Australian Herbaria and Systematics Institutions

From outside Australia: add the country code 61 and omit the leading zero of the area code

AD tel: (08) 8222 9307 fax: (08) 8222 9353 www.flora.sa.gov.au	HO tel: (03) 6226 2635 fax: (03) 6226 7865 www.tmag.tas.gov.au/Herbarium/Herbarium2.htm	MEL tel: (03) 9252 2300 fax: (03) 9252 2350 www.rbg.vic.gov.au/biodiversity/	NSW tel: (02) 9231 8111 fax: (02) 9251 7231 www.rbgsyd.gov.au/conservation_research/herbarium_services
CANB tel: (02) 6246 5108 fax: (02) 6246 5249 www.anbg.gov.au/	BRI tel: (07) 3896 9321 fax: (07) 3896 9624 www.epa.qld.gov.au/nature_conservation/plants/queensland_herbarium	DNA tel: (08) 8999 4516 fax: (08) 8999 4527 www.nt.gov.au/pwcnt	PERTH tel: (08) 9334 0500 fax: (08) 9334 0515 http://science.calm.wa.gov.au/herbarium/
QRS tel: (07) 4091 8800 fax: (07) 4091 8888	MBA tel: (07) 4048 4745/4743 fax: (07) 4092 3593	NT tel: (08) 8951 8791 fax: (08) 8951 8790	Australian University Herbaria Contact CHAH representative: Jeremy Bruhl UNE (02) 6773 2429
Council of Heads of Australasian Herbaria (CHAH) Chair: Dr Brett Summerell (NSW) brett.summerell@rbgsyd.nsw.gov.au www.chah.gov.au/	ABRS tel: (02) 6250 9554 fax: (02) 6250 9555 email: abrs@deh.gov.au www.deh.gov.au/biodiversity/abrs	Australian Botanical Liaison Officer (ABLO) Juliet Wege Herbarium Royal Botanic Gardens, Kew Richmond, Surrey TW9 3AB England	tel: 44-20-8332 5270 fax: 44-20-8332 5278 email: ablo@rbgkew.org.uk

These listings are published in each issue. Please inform the Editors of any change.

AUSTRALIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

The Society

The *Australian Systematic Botany Society* is an incorporated association of over 300 people with professional or amateur interest in botany. The aim of the Society is to promote the study of plant systematics.

Membership

Membership is open to all those interested in plant systematics. Membership entitles the member to attend general meetings and chapter meetings, and to receive the Newsletter. Any person may apply for membership by filling in a "Membership Application" form and forwarding it, with the appropriate subscription, to the Treasurer. Subscriptions become due on January 1 each year.

The ASBS annual membership subscription is \$45(Aust.); full-time students \$25. Payment may be by credit card or by cheques made out to *Australian Systematic Botany Society Inc.*, and remitted to the Treasurer. All changes of address should be sent directly to the Treasurer as well.

The Newsletter

The Newsletter is sent quarterly to members and appears simultaneously on the ASBS Web site. It keeps members informed of Society events and news, and provides a vehicle for debate and discussion. In addition, original articles, notes and letters (not exceeding ten published pages in length) will be considered.

Citation: abbreviate as *Austral. Syst. Bot. Soc. Nsltr*

Contributions

Send to the Editors at the address given below. They *preferably* should be submitted as: (1) an MS-DOS file in the form of a text file (.txt extension), (2) an MS-Word.doc file, (3) a Rich-text-format or .rtf file in an email message or attachment or on an MS-DOS disk or CD-ROM. *Non-preferred* media such as handwritten or typewritten by letter or fax are acceptable, but may cause delay in publication in view of the extra workload involved.

Formatting of submitted copy. Please use Word in formatting indents, bullets, etc. in paragraphs and for tables. Do not format primitively with tabs, which change with the Normal style sheet. If embedding tables or references or other Objects from other software (Excel, bibliographic software, etc.) ensure that these are converted to Word tables or paragraphs. Letters in abbreviations of Australian States (SA, WA etc., but Vic.) and organisations (e.g. ASBS, ABRIS) should not be separated by full-stops, but initials should be (e.g. W.R. Smith, not WR Smith).

Images: their inclusion may depend on space being available. Improve scanned resolution if printing your image is pixellated at a width of at least 7 cm (up to a 15 cm full page). Contact the Editors for further clarification.

The *deadline* for contributions is the last day of February, May, August and November. All items incorporated in the Newsletter will be duly acknowledged. Any unsigned articles are attributable to the Editors.

Authors alone are responsible for the views expressed, and statements made by the authors do not necessarily represent the views of the *Australian Systematic Botany Society Inc.* Newsletter items should not be reproduced without the permission of the author of the material.

Advertising

Advertising space is available for products or services of interest to ASBS members. The current fee is \$100 per full page, \$50 per half-page or less.

Flyers may be approved for inclusion in the envelope for products or services of interest to ASBS members. The current fee is \$100 per flyer, plus the cost of inserting them (usually roughly \$25-30). Flyers are not part of the Newsletter and do not appear with the Newsletter on the ASBS Web site.

A 20% discount applies for second and subsequent entries of the same advertisement. Advertisements from ASBS members are usually exempt from fees but not the insertion costs in the case of a flier. Contact the Newsletter Editors for further information.

Editors

Robyn Barker
State Herbarium of South Australia
Dept for Environment & Heritage
Hackney Rd, Hackney SA 5069
tel: (08) 8222 9348
fax: (08) 8222 9353
email: Barker.Robyn@saugov.sa.gov.au

W.R.(Bill) Barker
State Herbarium of South Australia
Dept for Environment & Heritage
Hackney Rd, Hackney SA 5069
tel: (08) 8222 9303
fax: (08) 8222 9353
email: Barker.Bill@saugov.sa.gov.au

Please address correspondence to Robyn Barker

Contents

Australian Systematic Botany Society Newsletter 126 (March 2006)

ASBS Inc. business	
From the President	3
28 th Annual General Meeting of the Australian Systematic Botany Society, Inc.	3
Attachment 1 – Minutes of the 2005 Annual General Meeting	5
Attachment 2 – President's Report	5
Attachment 3 – Treasurer's Report	6
Attachment 4 – Newsletter Report	14
Hansjörg Eichler Research Fund report	14
Life Membership awarded to Robyn Barker	14
Criteria for ASBS Award nominations	15
Life Membership	15
Nancy Burbidge Medal	16
Welcome to new members in 2006	16
Photograph: Members of the 2005 and 2006 ASBS Councils	16
Puzzle answer	16
Eichler Research Fund reports	
A molecular phylogeny for Australian <i>Elaeocarpus</i> (Elaeocarpaceae) and the affinities of a putative new taxon	17
Molecular systematics of <i>Tetratheca</i> and allies	20
Articles	
DNA barcoding: good for taxonomy?	22
<i>Flora Tasmanica</i> exhibition opening address	25
Miscellanea	
Change of standard form of name J. Kellermann	27
Collecting Charophytes	28
Ongoing <i>Lavandula</i> research in Australia	28
A view of herbaria and botanic gardens in <i>Nature</i>	29
News	
Australia Day Honours for services to <i>Eucalyptus</i>	29
An <i>Atlas of Living Australia</i>	29
CHAH business	
Australian Plant Census	30
ABRS report	31
ABLO report	33
Art competitions	
Waterhouse Natural History Art Prize	33
Margaret Flockton Award	33
Book reviews	
A <i>Flora of Australia</i> macrofungal first	34
A local Perth flora	35
Bioinformatics	37
Nitrogen fixation in Acacias	40
Exhibitions of interest	
<i>Flora Tasmanica</i> exhibition at Canberra Botanic Gardens	42
400 Years of Dutch history – Sydney and Canberra exhibits	42
Botanical illustrations in Sydney	42
Joseph Lycett art exhibition for Sydney, Newcastle and Canberra	43
Cook exhibition in Canberra	43
Australian landscapes in Canberra	43
Lhotsky's journal	43
Conferences	
Acacia 2006: Knowing and Growing Australian Wattles	43
The Impact of Peter Raven on Evolutionary and Biodiversity Issues in the 20th and 21st Centuries	43
Websites of interest	
New York Digital Library	44
Looking for an artist?	44
<i>Key to Tasmanian Dicotyledons</i>	44
From Taxacom	
New <i>World Checklist of Selected Plant Families</i> website	44
New version of <i>Kew Bibliographic Databases</i>	44
A Spanish digital botanical library	44
London plane tree: a word of warning?	44
ASBS Publications	45
ASBS Chapter Conveners	46
Contacting Major Australian Herbaria and Systematics Institutions	46